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OBJECTIVE APPROACHES TO TREATMENT IN PSYCHIATRY*

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Nosology and Diagnostic-prognostic Features of Mental Disorder

The causes and nature of mental disease, as well as the causes and mechanisms of response to therapy are unknown. Hoch (1) reported in his recent paper that in the field of psycho-therapy, for instance, different methods based on different interpretations of the nature of these illnesses and of the action of therapy achieved remarkably similar results in terms of recovery rates. He quite justly concludes that the beneficial effect is probably related to factors other than those assumed by the different doctrines of the therapists represented, and that the nature of these factors is essentially unknown.

If the course of evolution in other branches of medicine is useful as an example, it stands to reason that we must increasingly disregard doctrinaire assumptions and instead analyze each step in our therapeutic action down to its least common denominator, as it were, in order to obtain the objective view which is essential to scientific evaluation.

It is, however, not so simple to free ourselves of doctrinaire assumptions and preconceived notions. The very diagnostic nomenclature in our specialty is already markedly prejudicial to objectivity. From an early phase on, it became apparent that patients with schizophrenia, for instance, show markedly different clinical courses with or without treatment. Hence the term "schizophrenia" has very little to offer if we hope to derive from a diagnostic category something that will help us in evaluating the spontaneous recovery potential of a patient.

On the other hand, although the major categories of mental illness, especially the concept of schizophrenia, are too broadly drawn to be significant in terms of prognostic implications, nevertheless there remain in psychiatry certain distinct disease entities that have a characteristic course, duration and prognosis, as well as diagnostically significant symptomatology.

In general, however, for many conditions the psychiatric nosologic concept is too amorphous, as it is in schizophrenia where we are dealing with a mosaic of disturbances rather than a single disturbance. It becomes increasingly obvious that mental illness – both in horizontal direction if we speak of layers of personality, and in a vertical direction if we speak of specific psychological and somatic mechanisms – is a multifactorial process involving various systems of mind and body, that results in a pattern of disturbances within various organ systems rather than in a unitary type of disturbance. The more elements of this pattern or mosaic we get to know, the more objective data we shall have to base one or several therapeutic approaches on.

Let us exemplify this, for instance, in the case of schizophrenia. The same schizophrenic during any period of his illness may show a series of strikingly different courses if you look at the various functional systems in his mind and body; certain of these have far more prognostic significance than others. Kleist (2) was the first to specify that the amount of affectivity, independent of other abnormalities, may determine the outcome of the disease, in that marked affect denotes good recovery potential, and inadequate affect denotes the opposite.

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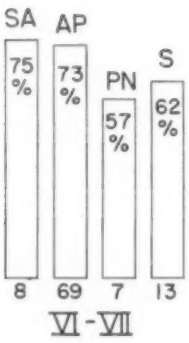

Fig. 1

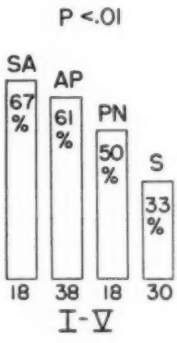

Fig. 2

*Fig. 1. Recovery rates for patients in the "favorable" blood pressure reaction groups (VI and VII) divided by clinical diagnosis. SA = schizoaffective psychoses; AP = affective psychoses; PN = psychoneuroses; S = schizophrenia. Recovery rates in these four clinical diagnostic groups do not differ significantly from each other.

Fig. 2. Recovery rates for patients in the "unfavorable" blood pressure reaction groups (I-V) divided by clinical diagnosis. SA = schizoaffective psychoses; AP = affective psychoses; PN = psychoneuroses; S = schizophrenia. Note that recovery rates in these four clinical diagnostic groups are significantly different from each other (P = <0.01).

*Figures 1 to 9 are from Alexander4; figures 10, 12 and 13 from Alexander, L.: The therapeutic process in electroshock therapy and the newer drug therapies. J.A.M.A. *162*: 966-969, (November) 1956.

Kleist was also the first to emphasize that preservation of capacity for abstract thinking is a prognostically favorable item, while early disturbance of capacity for abstract thinking is a poor prognostic indication. Thus prognostically discriminating functions can be elicited by psychological tests.

On the somatic level, several other prognostic indicators may be culled by measuring the responsiveness of the autonomic nervous system to two substances which normally stimulate the autonomic nervous system. In utilizing the adrenalin-mecholyl test (Funkenstein (3) test), I found that the patient's recovery potential is positively correlated to the degree to which his autonomic reactions exceed in intensity those shown by normals not under stress, while the prognosis is outstandingly poor in patients in whom one of the responses, that to epinephrine (i.e., adrenalin), is below par (4).

In comparing the predictive value of autonomic reaction pattern and the clinical psychiatric diagnosis in a consecutive series of 201 private patients with severe mood disorders (psychotic and borderline states) (4), we find that in the most favorable as well as in the least favorable blood-pressure reaction groups, the predictive value of the test exceeds that of clinical diagnosis. This was statistically demonstrated in the combined group VI-VII (fig. 1) where the recovery rate was uniformly high regardless of psychiatric diagnostic category (differences in recovery rate among the four clinical diagnostic subgroups were statistically insignificant). In other words, if a patient belongs to blood-pressure reaction group VI-VII, his recovery potiential seems to be related to this fact, irrespective of whether he suffers from a psycho-neurosis or from an affective, schizo-affective, or schizophrenic psychosis.

In contrast, in the "unfavorable" combined group I-V (fig. 2), the recovery potential was significantly associated with the clinical diagnosis (at better than the 0.01 level of confidence).

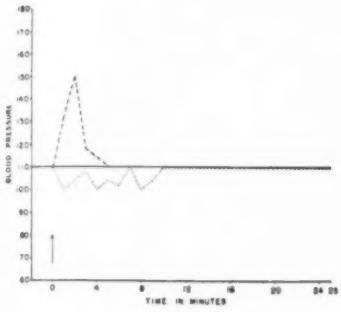

Fig. 3

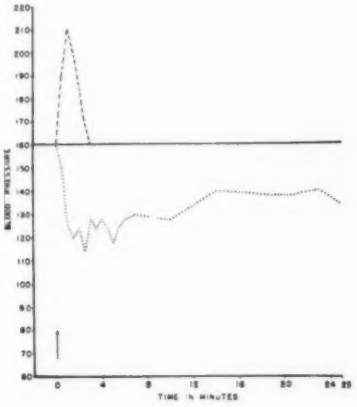

Fig. 4

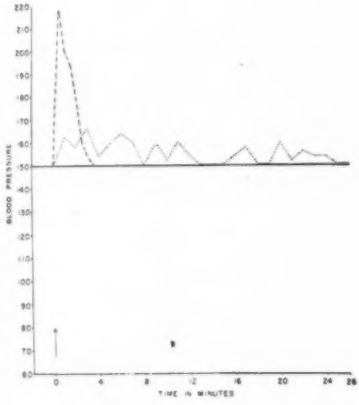

Fig. 5

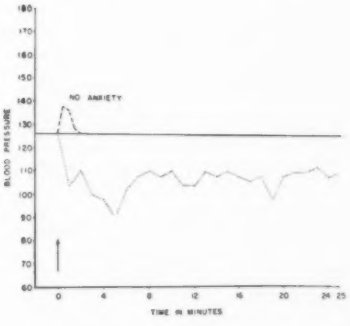

Fig. 6

Figs. 3-6 show blood pressure reaction types obtained by administration of epinephrine (0.025 mg. i.v.) (broken line) and by administration of mecholyl (10 mg. i.m.) (dotted line).
Fig. 3. Type III (normal person not under stress).
Fig. 4. Adrenergic (nicotinic) overreaction to mecholyl (Type I). (in a patient suffering from schizoaffective reaction). (Types II and IV are incomplete variants of the same pattern).
Fig. 5. Cholinergic (muscarinic) overreaction to mecholyl (Type VI). (in a patient suffering from depressive psychosis).
Fig. 6. Inadequate response to epinephrine (Type V). (in a patient suffering from catatonic schizophrenia. This patient failed to respond to electroshock therapy, but achieved a full and sustained recovery after insulin coma therapy).

Normals not under stress show a moderate or marked rise of systemic blood pressure on injection of epinephrine.* On injection of mecholyl (10 mg. i.m.) normals not under stress show a moderate or slight fall in systemic blood pressure, with reestablishment of the preinjection level of blood pressure within the first eight to ten minutes and maintenance of this level throughout the remainder of the 25-minute observation period (fig. 3).

*A moderate rise is defined as one of 20 to 40 mm/Hg following intravenous injection of 0.025 mg of epinephrine, or a rise of 50 to 75 mm/Hg on injection of 0.05 mg of epinephrine. A marked rise is defined as a rise of 40 to 75 mm Hg or more on intravenous injection of 0.025 mg of epinephrine or a rise of 75 to 100 mm/Hg or more on injection of 0.05 mg of epinephrine. (To prevent such marked rises, both Funkenstein and I have adopted 0.025 mg of epinephrine as the standard test dose, except for the purpose of testing inadequacy of response to epinephrine when the double dose can be given safely after inadequate response has been established by the smaller dose.)

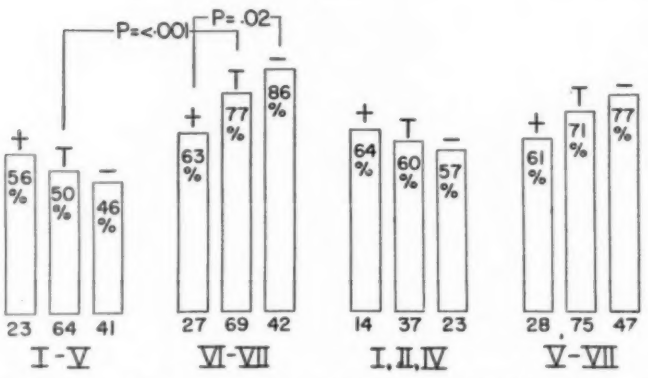

Fig. 7. Histograms illustrating recovery rates by group combinations, for patients treated with electroshock (combined convulsive-nonconvulsive electric treatment). In this figure and the subsequent figure 8 one of three histograms shown for each group represents the patients with epinephrine precipitable anxiety (the histogram on the left, marked by +); the second represents those without epinephrine precipitable anxiety (the histogram on the right, marked by −); the third represents the total derived from the combination of the two other groups (the histogram in the center of each group, marked by T). The percentage of recovered cases is shown near the top of each histogram; the total number of cases below each histogram.

Adrenergic-nicotinic over-reaction to mecholyl (Types I, II and IV) is most commonly seen in obsessive-compulsives, paranoids, anxiety states, and schizophrenics (fig. 4). How these patients will react to ECT is not clearly related to their test pattern (e.g. 22(60%) of 37 cases reacted favorably to ECT) (fig. 7).

Marked cholinergic-muscarinic reaction to mecholyl (type VI response) is characteristic of depressions, especially involutional depressions, as well as manic depressives (fig. 5). Patients with this pattern tend to react favorably to ECT: 51 (77%) of 66 cases achieved complete and/or social recovery (fig. 8).

Inadequate response to epinephrine (type V response) (fig. 6) is characteristically seen in certain treatment resistant catatonic schizophrenics, as well as in cases of pseudoneurotic schizophrenia, and in intractable psychalgic states, irrespective of etiology (neurotic, depressive or schizophrenic) (4a). I have never seen patients with this test pattern respond with sustained remissions to electroconvulsive therapy — or to psychotherapy either, for that matter.

Perhaps the biggest contribution of the Funkenstein Test may be to separate these epinephrine-insensitive cases from the group of cases selected for electroshock therapy, because electroshock therapy in all its varieties is uniformly disappointing and therefore contra-indicated in this group.

Of all treatments investigated, insulin coma therapy is so far still the only form of treatment which has proven itself consistently in these patients, accounting for all of the few recoveries in my case material.

Another practical clinical situation in which the adrenalin-mecholyl test can be of crucial importance is in the evaluation and the making of further treatment plans for patients who appear to have failed to improve with electroconvulsive therapy. On clinical grounds it is often difficult to tell whether such patients failed because their chief problem had been anxiety which had remained unresponsive to electric treatment, or whether they actually had been

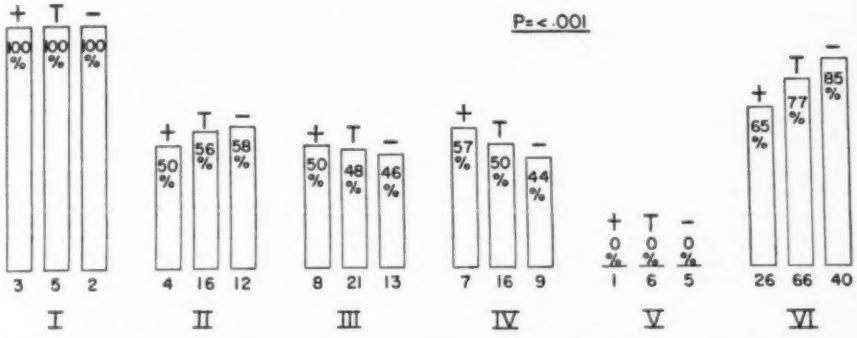

Fig. 8. Histograms illustrating recovery rates for individual blood pressure reaction groups, for patients treated with electroshock (combined convulsive-nonconvulsive electric treatment). $x^2 = 22.74$, $P = <0.001$. (For legends see explanation to figure 7).

suffering from depressions originally, especially agitated ones which are more treatment resistant, but had received insufficient treatment.

When the adrenalin-mecholyl test then reveals marked and prolonged hypotensive response to mecholyl, as characteristic of the type VI response combined with adequate response to epinephrine but without precipitation of anxiety by epinephrine (fig. 5), the conclusion is warranted that the patient had not received a sufficiency of electroshock therapy, both in terms of numbers of treatments and intensity of the stimulation applied, and that continuation and intensification of the course of electroshock therapy is indicated.

Additional valuable information supplied by the epinephrine-mecholyl test relates to the presence or absence of subjectively experienced anxiety following injection of epinephrine. Epinephrine-precipitable anxiety is characteristic of the neurotic group and may be present in some schizophrenics, where it tends to be a favorable prognostic sign, especially in regard to response to insulin-coma therapy. Anxiety of this type responds adversely to ECT, particularly when massive alternating currents are used, but responds favorably when non-convulsive electric stimulation treatments are added to the shock procedure, either in the form of separate treatments or in the form of combined convulsive-nonconvulsive treatments (shock-countershock technique) (Alexander, 5, 6). This technique is similar to the employment of these two therapeutic modalities in electronarcosis (Tietz, et al. (7).

I have obtained statistically significant proof that combined convulsive-non-convulsive treatment succeeds in eliminating the adverse effect of epinephrine-precipitable anxiety in the group combination classified as "unfavorable" by Funkenstein and associates, namely Groups I-V. Funkenstein and associates had found that of the patients with epinephrine-precipitable anxiety in this combined group (I-V) whom they had treated with purely convulsive electroshock, only 11.8% recovered, whereas I found that in this group – if treated with combined convulsive-nonconvulsive electroshock – 56% recovered (figs. 7 and 9).

In classical depression, not only is epinephrine-precipitable anxiety absent, but even the normal discomforts incidental to injection of epinephrine are not felt by these patients.

I believe that the fact that anxiety cannot be evoked nor depression enhanced by intravenous injection of epinephrine in the nuclear group of depressions

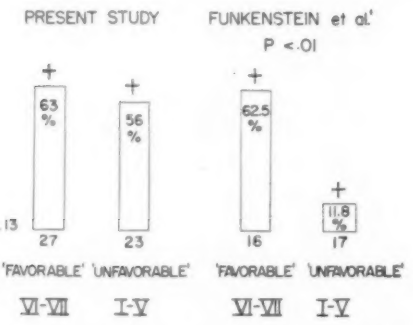

Fig. 9. Comparison of the recovery rates after combined convulsive-nonconvulsive electric treatment (present study) and after purely convulsive electroshock therapy (Funkenstein et al.[3]) for all patients with epinephrine precipitable anxiety, divided into "favorable" (VI and VII) and "unfavorable" (I-V) groups. Note that while the recovery rate in the "favorable" group is identical in the two patient populations, the recovery rate in the "unfavorable" group is higher in the group in which nonconvulsive treatment was added to the treatment regimen (present study).

is a very important fact that may have a fundamental bearing on the nature of the nervous-system disturbance occurring in classical depression. Gerard (8) has shown that epinephrine cannot influence cortical processes but that it may influence sub-cortical processes. This observation fits in with the hypothesis that depression is a state involving the higher cortical centers. The fact that epinephrine injection in a depressed patient cannot activate his anxiety is congruent with the theory that in depression anxiety is totally inhibited, possibly by a process of reciprocal inhibition or spread of inhibition. These are facts of significance which we shall review later in connection with our analysis of the objective data on hand on the nature of depression.

Excitation and Inhibition in the Psychoses: Depression Viewed as an Inhibitory State

In a series of experiments reported six years ago (9), I found that a reciprocal relationship exists between anxiety (defined as a state of tension with fear and psychomotor excitation) and depression (defined as a state of sadness with self-reproaches and psychomotor inhibition). In certain patients, depression can be converted into anxiety by the use of convulsive electroshock and reversed back into depression by the use of non-convulsive electric stimulation. I was able to repeat this alternation in a controlled manner, with consistent predictability. This finding has prompted me to consider depression as a state of overwhelming anxiety admixed with hopelessness – i.e., anxiety from which the ego can see no hope of escape and to which it has finally passively capitulated, in other words, anxiety that has resulted in an inhibitory state.

Depressive psychoses present an almost undiluted picture of inhibition, characterized by the following criteria:

1) Ideational and psychomotor retardation are prominent in the clinical picture.

2) The characteristic sleeplessness of the depressed patient corresponds in all details to that blocking of the normal inhibition inherent in sleep which animals exhibit in states of pathologic inhibition. In such states of pathologic inhibition, subliminal stimuli that normally would not prevent sleep or that

might even be conducive to sleep tend to arouse the animal and may produce the type of agitation called ultraparadoxical by Pavlov. Muncie and Gantt (10) have emphasized that pathologic inhibition consists of a blocking of normal activity. Thus blocking of the normal inhibition inherent in sleep may characteristically inhibit and prevent sleep in such animals.

3) Depression responds much more readily to electroshock than do manic or other excitatory states. This is in line with the finding reported by Robinson and Gantt (11) that inhibitory cortical processes are much more labile and readily extinguishable than are the excitatory.

4) Shagass (12) has recently shown that the driving response of the cerebral electroactivity is inhibited in depressions, but not in anxiety states.

5) Perception of discomfort, such as of that engendered by an intravenous injection of epinephrine, is blocked.

6) The sedation threshold, as Shagass (13) has shown recently, is consistently and significantly lower in depressions than in anxiety states.

That depression is not, however, a simple inhibitory reaction, is highlighted by the fact that it is well-nigh impossible to extinguish it by ordinary excitatory stimuli. In fact, such stimuli tend to deepen depression. This is equally true for strong psychological stimuli, such as those incidental to attempts at intensive psychotherapy, and for stimulatory techniques on the neuro-physiological level such as non-convulsive electrostimulation therapy which has a general excitatory effect upon the nervous system and which tends to aggravate or precipitate depression. On the other hand, convulsive electric shock – which reduces the excitability of the brain – has a favorable effect upon depression. These facts suggest that depression is a form of inhibition characterized by Pavlov as paradoxical, i.e., a form of inhibition which resulted from excessive quantities of excitation. This theory explains the apparently contradictory facts that measures that increase the state of excitation of the nervous system deepen this type of inhibition, while measures that decrease excitability of the nervous system decrease and finally abolish this form of inhibition.

In putting all these objectively verifiable facts together, the following hypothesis is offered – pending verification by further experimental testing – regarding the chain of psycho-physiologic events that appears to ensue (fig. 10).

Preception of the traumatic issue evokes a warning anxiety (or guilt). If the resulting anxiety is not used as a signal by the ego to set about meeting the situation but instead it dominates and floods the ego so that the ego cannot deal effectively with the traumatic issue, the resulting state constitutes what Fenichel (14) has called a primary traumatic neurosis. By its continued excessive stimulatory effect upon the ego, the anxiety may actually induce and maintain the traumatic state it was meant to avert. This constitutes a secondary traumatic neurosis in Fenichel's sense, although he did not specifically use this term.

The ego thus flooded with excessive emergency affect (anxiety, guilt and/or rage) may capitulate to either panic or depression, depending upon the intensity of the stimulus and the sensitivity and individual nature of the ego structure. When the stimulation produces an excitatory state of the ego, the ensuing traumatic disorganization constitutes panic. The reciprocal spread of excitation arising from the panicky excitation of the ego in turn enhances the anxiety, thus setting up an excitatory vicious cycle.

When the stimulation arising from the anxiety is supramaximal for the respective ego structure, traumatic inhibition of the ego results instead of

excitation, in accordance with Pavlov's law of paradoxical reaction to supra-maximal stimulation. This traumatic inhibition appears clinically as depression. The reciprocal spread of the resulting inhibition then inhibits the anxiety, and is manifested clinically in the striking absence of overt anxiety in severely depressed patients. Thus an inhibitory vicious cycle is set up.

Psychiatric Electrotherapy: Convulsive Electroshock as a Means of Reducing Excitability of the Nervous System

The nature of the therapeutic process in shock therapy is unknown. None of the great variety of reasons advanced in the literature about the mode of action in shock therapy is fully convincing or explains all the known facts.

If the fronto-centro-temporal region of the brain is stimulated electrically with currents below the intensity necessary to produce a convulsive seizure (fig. 11), the effect of such non-convulsive treatment is one of stimulation of activity of the nervous system, resulting psychologically in stimulation of and greater ease in communication, which in turn facilitates psychotherapy (fig. 11) – an excitatory state of the nervous system being essential for successful psychotherapy (Gliedman, Gantt and Teitelbaum) (15). If awareness for memory contents had been disturbed before such treatments were begun (as a result of preceding electro-convulsive therapy, for instance) the impaired memory may be restored by the treatment, sometimes dramatically, sometimes gradually (Alexander 9; Bowles 16; Russell, Page and Jillet 17; Fabing 18; Jones 19).

But, in an apparent paradox, it is a stimulation that may make some patients depressed – i.e., depression if still present may be aggravated or reprecipitated, or if previously merely latent may be provoked (Alexander 9). The fact that this excitatory treatment deepens rather than relieves depression is further confirmation of the working hypothesis sketched above – namely, that in depression we are dealing with a paradoxical inhibitory response to excessive quantities of excitation.

If the fronto-centro-temporal region of the brain is stimulated with electric current of sufficient intensity to produce a seizure and an actual seizure does result, such treatment is often followed by a dramatic relief of the depressive state. Concurrently, there appears at first early in the series of treatments, a decreased capacity for communication in general, a specifically reduced ability to bring up, express and discuss anxiety-laden material, an increase in the patient's psychic rigidity, decrease in insight, reduction in overt expressions of anxiety in spite of often an increasing state of non-verbalized inner tension – patient sits seething with tension and anxiety that he cannot express – an anxiety of the warning or alerting type which in certain patients, probably depending upon its original quantity, erupts in the form of a general apprehensiveness that is often focussed against the treatment. This is obviously due to a release of warning anxiety which had been inhibited by the now lifted depression, a phenomenon which explains the reciprocal relationship between warning anxiety and depression which I have pointed out earlier (9). The next phase of treatment seems to foster "good girl" or "good boy" attitudes, interpretable as the coming into play of the defensive operation of reaction formation. There is a gradually decreasing awareness for memory contents, a concurrent slowing in cerebral electro-activity and an increase in the convulsive threshold, together with slowness in cerebration and a reduction in spontaneity and communications.

Then, however, as treatment progresses further and during the initial phase following the treatment series, these patients become increasingly able to tolerate anxiety-provoking material, until finally the successfully electroshocked patient

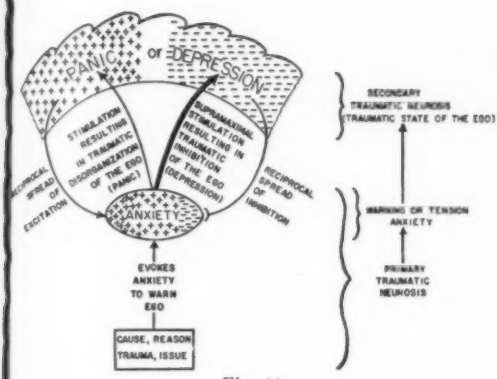
PANIC
or
DEPRESSION
STIMULATION RESULTING IN TRAUMATIC DISORGANIZATION OF THE EGO (PANIC)
SUPRAMAXIMAL STIMULATION RESULTING IN TRAUMATIC INHIBITION OF THE EGO (DEPRESSION)
RECIPROCAL SPREAD OF EXCITATION
RECIPROCAL SPREAD OF INHIBITION
ANXIETY
EVOKES ANXIETY TO WARN EGO
CAUSE, REASON TRAUMA, ISSUE
SECONDARY TRAUMATIC NEUROSIS TRAUMATIC STATE OF THE EGO)
WARNING OR TENSION ANXIETY
PRIMARY TRAUMATIC NEUROSIS

Fig. 10

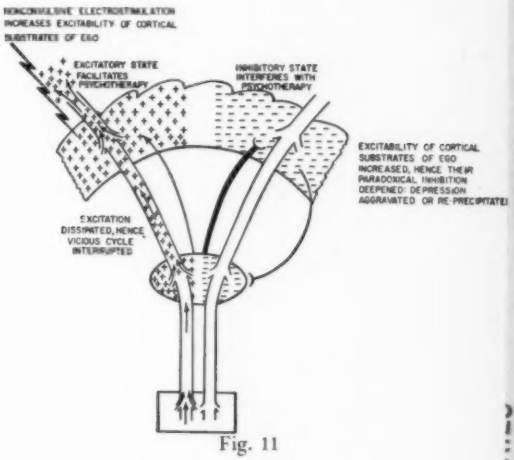
NONCONVULSIVE ELECTROSTIMULATION INCREASES EXCITABILITY OF CORTICAL SUBSTRATES OF EGO
EXCITATORY STATE FACILITATES PSYCHOTHERAPY
INHIBITORY STATE INTERFERES WITH PSYCHOTHERAPY
EXCITABILITY OF CORTICAL SUBSTRATES OF EGO INCREASED, HENCE THEIR PARADOXICAL INHIBITION DEEPENED: DEPRESSION AGGRAVATED OR RE-PRECIPITATED
EXCITATION DISSIPATED, HENCE VICIOUS CYCLE INTERRUPTED

Fig. 11

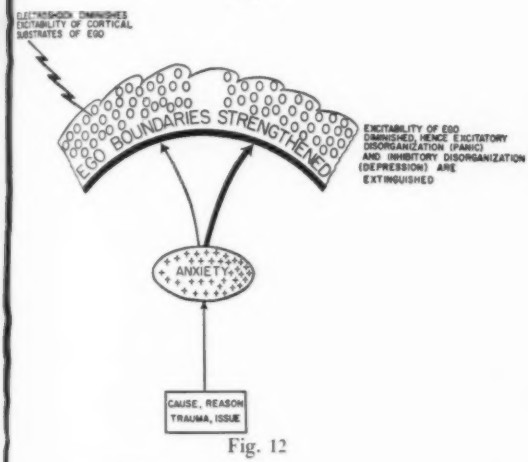
ELECTROSHOCK DIMINISHES EXCITABILITY OF CORTICAL SUBSTRATES OF EGO
EGO BOUNDARIES STRENGTHENED
EXCITABILITY OF EGO DIMINISHED, HENCE EXCITATORY DISORGANIZATION (PANIC) AND INHIBITORY DISORGANIZATION (DEPRESSION) ARE EXTINGUISHED
ANXIETY
CAUSE, REASON TRAUMA, ISSUE

Fig. 12

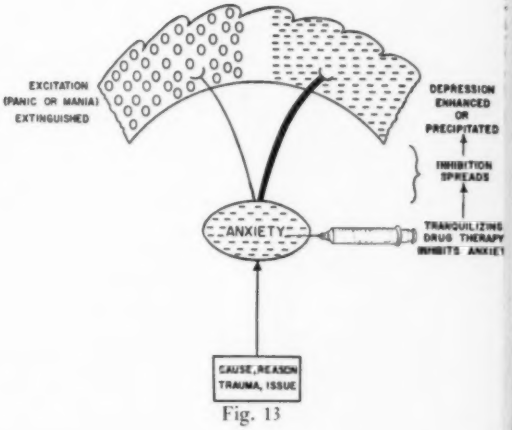

Fig. 13

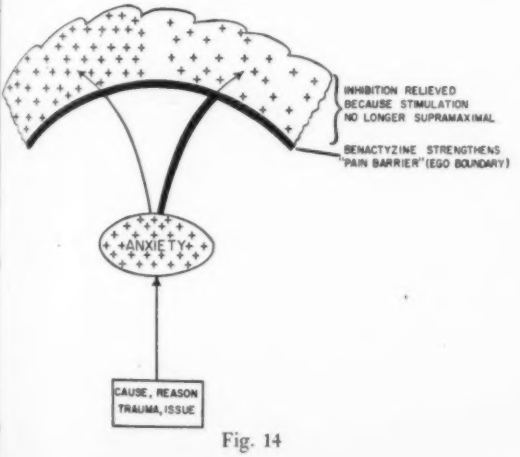
INHIBITION RELIEVED BECAUSE STIMULATION NO LONGER SUPRAMAXIMAL
BENACTYZINE STRENGTHENS "PAIN BARRIER" (EGO BOUNDARY)
ANXIETY
CAUSE, REASON TRAUMA, ISSUE

Fig. 14

Fig. 10. Schema illustrating the relationship of trauma, anxiety, panic and depression. + denotes excitation; – denotes inhibition.

Fig. 11. Schema illustrating the effect of nonconvulsive electric stimulation therapy. + denotes excitation; – denotes inhibition.

Fig. 12. Schema illustrating the effect of convulsive electroshock therapy. + denotes excitation; 0 denotes extinction.

Fig. 13. Schema illustrating the effect of tranquilizing drug therapy. – denotes inhibition; 0 denotes extinction.

Fig. 14. Schema illustrating the effect of benactyzine. + denotes excitation.

emerges as an individual who is no longer frightened into panic or paralyzed into depression by his own warning – or tension-anxiety.

Thus the effect of convulsive electric treatment is obviously one of reduction in excitability of the nervous system. It appears to be for this reason that the sub-cortical warning-anxiety no longer has the power to overstimulate the cortical ego into panic or depression; the ego and its defenses appear strengthened because the excitation threshold of the cortex has been raised (fig. 12). The fact that this excitability-reducing treatment relieves depression again confirms the above-sketched hypothesis that depression is a paradoxical inhibitory reaction to excessive stimulation.

The picture of convulsive electroshock presented above as a simple means of reducing cortical excitability is somewhat at variance with elaborate speculations on the effect of this treatment with which the literature teems. In view of the rapidity with which the changes described above are often brought about, we will have to discount some of the theories favoring the change in the functioning of endocrine glands, for instance, as the primary cause of improvement as a result of ECT, because such changes can develop in the course of time alone, and furthermore such theories would not fit with the experimental observation quoted above that not only the unfavorable side effects, but also the crucial favorable effects of ECT can be rapidly undone by non-convulsive electric stimulation therapy. These mental changes are more parsimoniously and adequately explained by a simple change in excitability of the brain. Naturally such changes in excitability must have neurochemical concomitants.

Marrazzi and Hart (20), Evarts and Marshall (21), Purpura (22) and others have demonstrated that the psychotogenic drugs, such as LSD, have selective and differential facilitating and inhibiting effects upon the synapses of the central nervous system. The nature of the possible changes that may occur with electroshock and electrostimulation respectively have not yet been investigated but pose a challenging subject for further research which may throw greater light on the detailed changes in physiology thus produced. Be this as it may, differential changes in excitability produced by non-convulsive electric stimulation treatment and convulsive electroshock respectively remain thus far the only proven, objectively demonstrable fact related to the clinical action of these forms of treatment.

The probability that reduction in excitability is the pivotal point in electroshock therapy is further emphasized by the fact that the effect of convulsive electroshock is not uniform but depends upon the intensity of the electric stimulus applied, even within the range of convulsion-producing stimulation. Contrary to the assertion of some authors who believe that the convulsion determines the therapeutic effect in an all-or-none manner, I have obtained evidence that the strength of the convulsion-producing stimulus is of decisive importance. The opponents of this latter view have argued that the low-amperage convulsions (obtained with an average of 10 to 20 milliamperes of current) produced by means of unidirectional current, on which are based my comparisons to the high-amperage convulsions (obtained with an average current of 330 to 500 milliamperes), probably did not produce an actual convulsive seizure. However, I have assured myself that in all the cases included for statistical comparison the full march of a tonic-clonic seizure independent of continued electric stimulation was observed, the only difference being that in the low-amperage convulsions the arms tended to be flexed, while in the high-amperage convulsions the arms tended to be extended (5, pp. 116-119).

The psychophysiologic effect of these various types of convulsion was also different. Low-amperage convulsions produced little or no memory disturbance, evoked no anxiety or aversion to treatment in the majority of the cases, but their anti-depressant effect was also less marked, so that they were less effective in the most treatment-resistant cases, especially involutional depressions and in certain schizo-affective and schizophrenic states. High-amperage convulsions produced marked reduction of awareness for memory contents, evoked anxiety and aversion to treatment in the majority of cases, but their anti-depressant effect was more marked in that they frequently brought about recovery of patients with severe involutional, schizo-affective, and schizophrenic psychoses who had been resistant to low-amperage convulsions. This finding was independently confirmed during a control observation period of one year during which only one method of treatment was used while during the previous year the other method had been used exclusively (Porter, 23).

Horsley Gantt and his co-workers (24), using the conditional reflex technique, confirmed the fact that convulsive treatment is not an all-or-none phenomenon but achieves results dependent upon the intensity of the stimulus. While Fleck and Gantt (25), found that following administration of standard high-amperage convulsive electroshock there was a marked reduction in the ability to form conditional reflexes, Peters and Gantt (24) found this deficit absent or less marked when convulsions were produced with low-amperage (square-wave, unidirectional) stimuli.

It points up the advantage of the objective method of evaluation that Gantt and his co-workers were able to resolve a controversy in which clinicians have engaged for years, by subjecting this question to a simple but crucial experiment.

This fact highlights the importance of dosage in electroshock therapy. A violent postconvulsive confusional state is generally an indication that the treatment current chosen has been too high. Lowering the treatment current, or counterbalancing it by a sufficiency of non-convulsive stimulation during the immediate postconvulsive phase (shock-countershock technique – Alexander (5), (9)) will abolish this undesirable side effect. On the other hand, complete absence of any reduction of awareness for memory contents, if combined with inadequate treatment response, is definite indication that treatment currents chosen had been too low.

Drug Therapy

1. Tranquilizing Medication

The action of the new tranquilizing drugs – chlorpromazine and reserpine – is fundamentally different from electroconvulsive therapy, in that these drugs appear to suppress the primary, epinephrine-precipitable, sub-cortical warning – or tension-anxiety (Ayd, 26), while exerting only an indirect influence on the secondary cortical manifestations of panic or depression (fig. 13).

Hence, tranquilizing medication, particularly with chlorpromazine, is most effective in manic states, since that condition is most directly power-driven toward excitation by tension-anxiety (5), and is a state in which important ego functions are relatively preserved. Conversely, for exactly the same reasons and in remarkable accord with the fact that inhibitory cortical processes are more readily extinguishable than are excitatory ones (Robinson and Gantt, 11), manic psychoses are least readily relieved by electroconvulsive therapy, which is an extinction type of treatment, unless the treatment is carried to the point of obliterating even the mere perception of warning – or tension-anxiety.

An ancillary but far from insignificant reason for the superb clinical results of chlorpromazine therapy in manics is that these psychoses tend to be of

naturally short duration. Hence if the manifestations of the psychosis can be suppressed for the natural duration of the manic episode, the patient can continue to live a rather normal life and may even be able to keep on working without experiencing either the social disadvantages of morbidity or the undesirable suppression of cortical functioning produced by electroshock.

Depression is at the other end of the scale of effectiveness of the new tranquilizing drugs. Not only are chlorpromazine and reserpine entirely ineffective in most cases of depression, but they are actually contra-indicated since they may aggravate the condition. The reason for their ineffectiveness obviously lies in the fact that in depression paralysis of the cortical ego is most profound. Inhibition of ego functions is further aggravated by these drugs for two reasons: 1) the inhibitory state of the ego has not only become independent of continued over-stimulation by the warning anxiety that had originally paralyzed the ego into depression, but 2) by a process of negative induction leading to spread of inhibition, the inhibited state had extended to include the original warning anxiety as well (see fig. 10). By further inhibiting what remains of the warning anxiety, the inhibitory state of the ego will be deepened by setting into motion an inhibitory vicious cycle.

Thus it comes about that further suppression of the original warning-anxiety by means of tranquilizing drugs will actually deepen an existing depression (fig. 13) or in some cases will precipitate depression. Conversely, enhancing the warning-anxiety by epinephrine injection, for instance, may temporarily relieve depression.

Depression is indeed the most significant mental-emotional complication arising from the use of these tranquilizing drugs.

The new tranquilizing drugs are less consistently effective in catatonic and excited schizo-affective states than they are in manic states. In catatonic and hallucinatory paranoid states I have found reserpine relatively more effective than chlorpromazine.

In most other anxiety and panic states and in related regressive neurotic and psychotic syndromes, I have found the use of chlorpromazine and reserpine generally unsatisfactory from the long-range point of view, with a few remarkable exceptions that responded very well. All those who did respond well were cases marked by agitation and over-activity, and these are the cases that seem most amenable to chlorpromazine.

The great variation in the response to tranquilizing drugs by patients with neurotic and borderline states may in part be explained by the fact that one of the more important effects of these drugs is to enhance suggestibility. West (27) has shown that the use of these drugs increased the ease with which patients could be hypnotized or otherwise influenced by suggestion.

2. The action of *relaxant medication*, such as exemplified by the new drug, Miltown (Selling 28), is similar to that of the tranquilizing drugs, except that its inhibitory effect is less profound. This is an advantage in the psychoneuroses, in which marked reduction of drive such as brought about by tranquilizing drugs is often anxiety-provoking and thus tends to counteract the desired effect of the medication. Because of its less profound inhibitory action Miltown also does not tend to precipitate or aggravate depression; but for the same reason it is also much less effective in the treatment of psychotic states of excitement.

3. *Ataractic* (*de-confusing*) *action* has been described as the characteristic effect of Frenquel (Fabing 29). In contrast to the tranquilizing drugs, Frenquel does not depress the activity of the hypothalamus either clinically or in the

electroencephalogram; it counteracts the effects of LSD and of mescaline without inducing sedation, and restores the resting activity of the electroencephalogram after its disruption in the form of enduring arousal by LSD or mescaline (Himwich 30).

4. *Anti-phobic Medication.* This new group of compounds, whose most effective representative is Benactyzine (Suavitil, Parasan) was developed and tested by Jacobsen and his co-workers (31, 32, 33, 34).

The action of Benactyzine is fundamentally different from that of the tranquilizing drugs, in that it is anti-cholinergic (while the tranquilizing drugs are anti-adrenergic) and that it facilitates rather than suppresses the orienting response and conditional reflex responses. Discrimination and learning are improved as well, in that the animals respond more readily and precisely. In an ingenious series of experiments using both Masserman's (35) technique of conflict-induced behavior (a form of avoidance conditioning) as well as the classical method of conditioning requiring discrimination of signals, Jacobsen and his co-workers (31, 32, 33, 34) proved that the drug abolished the psychic pain, fear, and the resulting "neurotic" inhibitory avoidance response engendered by stress. The drug seemed to have strengthened the ego boundaries and raised the "pain barrier", (fig. 14) thus eliminating fear.

It is of particular interest and confirmation of the conceptual scheme of the relationship of these phenomena to depression presented above that Benactyzine has proved itself to be a mild anti-depressant in clinical states of depression in human beings, both of manic-depressive and involutional type.

The Objective Aspects of Psychotherapy

Psychotherapy viewed as a process of extinction of conditioning, by means of repetition of signals without reinforcement, in the supportive presence of the physician.

Modern psychotherapists soon discovered that insight in itself is not curative, but that a process of examining and re-examining key problems and their ramifications is necessary. This process has been aptly termed "working through" by the psychoanalytic school.

The effectiveness of the working-through process is influenced — apart from the thoroughness with which the historical and emotional ground is covered — by the nature of the rapport that the physician succeeds in establishing with his patient, based on primary, often non-verbal, means of communication between the two.

There is no generally accepted explanation of the efficacy of the working-through process. Clinically, it is quite obvious, however, that this process has quantitative aspects as well as qualitative ones. How often does one have to go over the same ground? And how much of the real feeling kindled by the important traumatic events does the physician have to re-evoke?

It has impressed me that when one has succeeded in carrying this re-evocation of feelings to the point of intense emotional abreaction that then for a time there is a gradual lessening of the emotional charge obtainable by repeatedly going over the same ground. But later, after a few instances of apparent lessened response, there is often a rebounding recrudescence and intensification of the emotional response before it once more subsides and finally burns out.

This phenomenon has a correlate also in the often encountered apparent worsening of the mental disturbance after initiation of treatment and before improvement supervenes. Franz Alexander (36) has called particular attention to this very vexing aspect of psychotherapy.

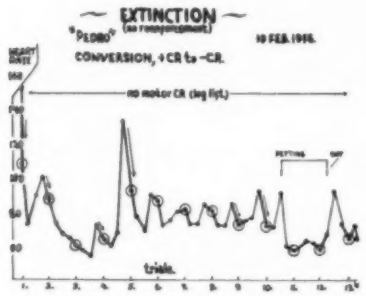

Fig. 15. Graph illustrating extinction of conditional acceleration of the heart rate in the dog. Courtesy of Dr. W. Horsley Gantt.

For some time I have felt that this and certain other vexing phenomena occurring in the course of psychotherapy may be explicable in terms of Pavlov's laws of the higher nervous activity of the cerebral cortex (37, 5, p. 53), but I did not fully appreciate the remarkable relevance these two fields of study have for one another until last winter when I had the opportunity to witness the behavior of dogs in whom conditional reflexes were being extinguished, during a series of experiments in Dr. Horsley Gantt's laboratory at the Johns Hopkins Medical School. I am grateful to Dr. Gantt and his co-workers for the opportunity they generously offered me to watch their experiments.

It became clear to me then that the most striking analogue and model of the working-through process is the process of extinguishing conditional reflexes by means of repeated exposure to the conditioned signal without any subsequent reinforcement of the unconditional stimulus, a method of extinction discovered by Pavlov (38) and worked out in its important quantitative intricacies by Horsley Gantt (39).

For example: The heart rate of the dog 'Pedro' had been conditioned to tachycardia (up to 155 beats per minute) upon the sounding of a tone that preceded an electrical stimulus to a foreleg. Extinction of the conditional response of this dog's heart rate was undertaken by repeating the tone without following it up with the usual shock. As shown in fig. 15, after three such unreinforced signals the heart rate fell to normal (about 60 beats per minute) and remained low at the fourth signal; but at the fifth signal the heart suddenly resumed its former marked conditioned acceleration and then stayed above normal throughout the period during which the next five signals (6 to 10) were administered, showing additional superimposed accelerations at each of these five signals. Then when the investigator petted the animal, the heart rate dropped dramatically to a normal level and showed no superimposed accelerations through the eleventh and twelfth signals while the animal was being petted. After petting had been discontinued, there was again a slight rise at the thirteenth signal.

This experiment appeared to me to illustrate in a neatly quantitative way all the phenomena that are so characteristic of psychotherapy: The lessening of the disturbance following presentation of its signals without reinforcement — i.e., the working through, then the sudden paradoxical recrudescence of the disturbance, succeeded by its effective extinction by meaningful and supportive interpersonal communication and rapport (in the case of the dog, petting).

A further analogue between the extinction of conditional responses during deconditioning on the one hand and the modification of symptoms during psycho-

therapy on the other is exemplified by the appearance of substitutive phenomena occurring during both of these processes. Often in psychotherapy, when a symptom is about to be abandoned it is first replaced by a substitutive symptom which in turn may give way to the original symptom, the two alternating in a see-saw manner before both are abandoned; so also during the process of its extinction the conditional response may be replaced by a substitutive response that bears no obviously recognizable relationship to the original conditional response. This occurred with remarkable dramatic clarity during the de-conditioning treatment of Dr. Horsley Gantt's dog 'Skipper' when during extinction of his old conditional response of raising the left foreleg, this became replaced by compulsive chewing on a plastic tube that passed near his head, a motor reaction he had never before shown.

Another analogue: In more severely disturbed animals (dogs, sheep, or goats (Liddell, 40)), the process of extinction via repetition of signals without reinforcement is no longer effective; on the contrary, their disturbance may become worse in response to such non-reinforced stimuli. Pavlov has called this the ultra-paradoxical phase of nervous-system reactivity. In this way, (i.e., during the phase in which small, normally inhibitory stimuli become excitatory) in man for instance, silence may be upsetting following a harrowing or catastrophic event that had aroused severe emotional disturbance, just as battle neuroses may develop during the lull after the battle. In such settings, the absence of anxiety-provoking stimuli may act as an inhibitor of the defensive forces originally called into play by the anxiety.

The succession of paradoxical and ultraparadoxical phases – the 'paradoxical' inhibition in response to excitation followed by 'ultraparadoxical' excitation in response to inhibition, which then may again act as a supramaximal stimulus deepening the 'paradoxical' inhibitory state – may explain why some psychotic states become worse following attempts at psychotherapy, in the same manner that the severely disturbed (probably psychotic) animals become worse, i.e., more severely disturbed, after exposure to non-reinforced stimuli. Phenomena such as these probably underlie the autokinetic, vicious-cycle-like, apparently spontaneous worsening of mental disturbances; while the reverse process, namely an ever-widening improvement following initiation of successful extinction of a disturbance constitutes the setting up of a beneficent cycle. This 'autokinesis' so convincingly described by Horsley Gantt (41), has a striking counterpart in psychotherapy with human beings, in that "once the process of recovery is initiated it has a tendency to spread" (Eissler, 42), p. 145).

While experiences in animals naturally cannot be transposed point for point to the human being – after all, even in animals marked species differences exist (Liddell, 40) – nevertheless the technique of extinction of conditional responses by repetition of their unreinforced signals offers a quantifiable, objective framework which if successfully adapted to the study of the psychotherapeutic process in humans might supply objective data of great practical importance. While modern psychotherapy, especially psychoanalysis, has provided us with a rich variety of significant and genuine "signals" of mental and emotional disturbance, it may remain for the behaviorist trained in the study of the physiology of higher cortical activity to elevate the art of psychotherapy into a quantifiable instrument for the predictable modification of disturbed emotions, thinking, and behavior.

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Résumé

Les causes et la nature de la maladie mentale, aussi bien que la raison des succès ou des échecs des thérapeutes sont inconnues. La pulpart des théories actuelles sont inadéquates. Il faut laisser de côté les hypothèses quand celles-ci entravent les possibilités d'avancement en forçant notre façon de penser dans un moule rigide. Notre objectivité doit consister à noter tous les aspects perceptibles de la situation sans préjugés.

La maladie mentale semble être un processus qui relève de nombreux facteurs, qui ne peut être défini adéquatement ou même caractérisé par les diagnostics présentement disponibles dans notre classification. Un diagnostic objectif dépendra de l'identification et de l'étude d'indices spécifiques mesurables tant somatiques que psychiques qui pourront correspondre, d'après les statistiques, à l'évolution et au résultat de la maladie, c'est-à-dire au potentiel d'amélioration spontanée et à la susceptibilité aux traitements. Le test au mécholyl et à l'adré naline est un tel indice somatique mesurable. Dans les groupes les plus favorables (VI et VII) et dans les moins favorables (V), la valeur de prédiction du test est supérieure à celle des diagnostics cliniques en psychiatrie. Le test est aussi utile pour différencier entre les patients qui ne s'améliorent pas avec un certain traitement comme l'électrochoc parce que le traitement n'était pas indiqué, et les patients chez qui le traitement est demeuré insuffisant en intensité ou en quantité.

La réaction du patient à la stimulation du S.N. autonome jette aussi un peu de lumière sur les processus psycho-physiologiques fondamentaux de la maladie mentale. Le fait qu'une injection d'adrénaline chez un patient déprimé

ne peut mobiliser l'anxiété concorde avec la théorie que dans la dépression, l'anxiété est complètement inhibée, possiblement par un processus d'inhibition réciproque ou par une diffusion de l'inhibition.

Que la dépression ne soit cependant pas qu'une simple réaction d'inhibition, ceci est appuyé par le fait qu'il est pratiquement impossible de la supprimer par les stimuli excitants ordinaires. En fait, de tels stimuli tendent à aggraver la dépression. Ceci est aussi vrai pour les sitmuli psychologiques puissants tels que ceux employés dans les tentatives de psychothérapie intensive. De même les techniques exerçant leur effet stimulant au niveau neurophysiologique tel que le traitement par l'électrostimulation non convulsive qui a un effet généralement excitant sur le système nerveux et qui tend à provoquer ou à aggraver la dépression. D'un autre côté, les électro-chocs convulsifs – qui diminuent l'excitabilité du cerveau – ont un effet favorable sur la dépression. Ces faits suggèrent que la dépression est une forme d'inhibition que Pavlov caractérisa de paradoxale, c'est-à-dire une forme d'inhibition causée par un excès de stimulation. Cette théorie explique l'apparente contradiction des faits, à savoir que des moyens augmentant l'état d'excitation du système nerveux accentuent ce genre d'inhibition, alors que des moyens qui diminuent l'excitabilité du S.-N. diminuent aussi et finalement font disparaître cette forme d'inhibition.

Il semble que dans la dépression nous avons affaire à une inhibition paradoxale en réponse à des quantités excessives d'excitation venant de l'anxiété d'alarme ou de tension. L'effet des électro-chocs convulsifs est évidemment de diminuer l'excitabilité du S.N. surtout du cortex. Il semble que, pour cette raison, l'anxiété d'alarme au niveau sous-cortical n'a plus le pouvoir de stimuler à l'excès l'ego du cortex et de le précipiter dans la panique ou la dépression; l'ego et ses défenses semblent renforcés à la suite d'électro-chocs convulsifs parce que le seuil d'excitation du cortex a été augmenté. L'anxiété d'alarme, cependant, qui avait été inhibée par la dépression maintenant disparue, est relâchée à la suite du traitement par électro-chocs. Ce phénomène explique la relation réciproque existant entre l'anxiété d'alarme et la dépression.

La probabilité que la diminution de l'excitabilité est le point pivot dans le traitement par électro-choc est appuyée par le fait que les électro-chocs n'améliorent pas la dépression d'une façon uniforme ni totale mais les effets dépendent de l'intensité du stimulus électrique appliqué même dans les limites de la stimulation produisant des convulsions. Ceci souligne l'importance du dosage dans le traitement par les électro-chocs.

Les médicaments tranquillisants (largactil – reserpine et autres composés de phenothiazine) inhibent l'anxiété primaire de tension et d'alerte – anxiété inconsciente sous-corticale et précipitable par l'adrénaline; inhibent aussi ses effets secondaires surtout la panique et la manie. Cependant, ils peuvent aggraver ou provoquer la dépression parce que l'effet d'inhibition peut diffuser.

Le nouveau médicament meprobamate (Miltown) a un effet semblable à ceux des substances tranquillisantes excepté que ses effets d'inhibition sont moins marqués. Ceci est un avantage dans les psychonévroses.

L'action des substances qui diminuent la confusion (ataractiques) Frenquel (, 4-piperidyl benzhidrol hydrochloride), et celle des substances antiphobiques et antidépressives, Benactysine (2-diethylaminoethyl benzilate hydrochloride), sont différentes. Elles demandent à être étudiées plus profondément quant à leur psychophysiologie et à leurs indications cliniques.

L'importance de la disparition du conditionnement favorisant l'apprentissage et la suggestion en psychothérapie ainsi que le besoin pour des études objectives sont soulignés.

UN ASPECT DU TRAITEMENT PSYCHIATRIQUE EN HOPITAL GENERAL: L'ELECTROPLEXIE*

par les Drs C. A. Gauthier, Maurice Coulombe, René Pion et Jacques Turmel

Le traitement de certains malades psychiatriques dans un hôpital général a toujours présenté des difficultés. Cependant depuis l'utilisation des méthodes propres à la spécialité, tel que l'électrochoc, auxquelles sont venus heureusement s'ajouter des médicaments puissants comme les neuroplégiques, les curarisants, bien des problèmes ont perdu de leur intensité. Nous ferons une brève revue de sept années d'électroplexie à l'hôpital de l'Enfant-Jésus. Evidemment, ce n'est qu'un aspect du travail psychiatrique dans un hôpital général et il ne faudrait pas garder l'impression que l'arsenal thérapeutique se limite aux électrochocs.

Le but de la présentation est de montrer qu'il est relativement facile de pratiquer ces traitements sans modifier la discipline de l'hôpital avec un maximum de sécurité pour le malade à qui souvent est évité la stigmatisation de l'isolement.

En ce qui concerne les appareils, nous utilisons la Liberson Brief Stimulus et, depuis quelque temps, la Mol-Ac II. Quant à la technique, elle est connue. Nous proscrivons chez nos malades l'emploi à dose filée de barbituriques qui augmente le seuil convulsif et prédispose à une apnée plus prolongée. L'électrochoc, bien que très efficace sur les états véritablement hyperthymiques, l'est beaucoup moins dans les états anxieux.

Il n'est pas toujours facile de distinguer certaines anxiétés de véritables états dépressifs et c'est ce souci surtout qui constitue la réelle difficulté de l'indication. A cet effet, nous nous servons soit du test de Funkenstein ou de narcose sous Amytal comme révélateur. Afin de vaincre certaines craintes compréhensibles, l'électrochoc peut être précédé d'une médication appropriée. En d'autres circonstances, lorsque le syndrôme clinique nous laisse craindre l'éclosion d'une angoisse post-électrochoc, nous augmentons la durée du sommeil par une injection d'Amital Sodium i.v. Depuis 1953, les curarisants ont permis de surmonter certaines contre-indications d'ordre cardio-vasculaire ou osseux.

Aucun accident grave n'a été déploré durant ces sept années. Sur 2,527 électrochocs il se produisit deux lésions de corps vertébraux décelés radiologiquement et d'évolution heureuse; ces deux malades sont retournés à leur travail et après quelques semaines toute douleur était disparue.

Le Largactil, en outre de calmer certains malades pendant la cure et de parer aux urgences, nous donne l'impression d'augmenter le seuil convulsif et d'agir comme léger stimulant respiratoire; de plus, son emploi dans la manie et l'hypomanie a permis d'éliminer les électrochocs.

Les malades sont ordinairement dirigés vers nous par les médecins. De plus, les consultations pour malades déjà hospitalisés représentent un chiffre imposant puisque 44.9% de nos malades psychiatriques nous sont ainsi confiés, mais seulement 15.8% du nombre total de ce dernier groupe sont soumis à l'électroplexie.

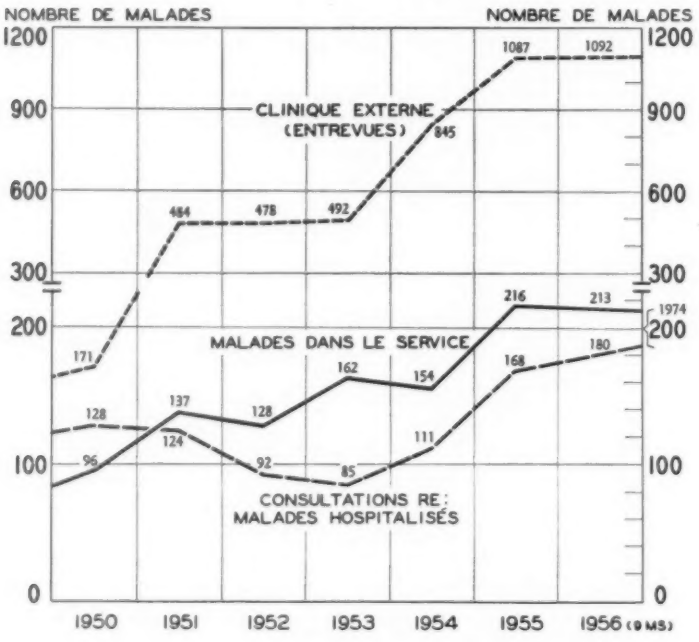
En regard des traitements électriques, l'élément féminin prédomine dans une proportion de 72%; l'âge varie de 10 à 72 ans avec une moyenne de 37.2 ans.

De beaucoup, les états dépressifs sont les plus fréquemment rencontrés. Les mélancolies sont ordinairement traitées en milieu spécialisé, les raptus possibles étant toujours redoutés; malgré cela elles suivent, avec les psychoses post-partum

*Travail du service de Neurologie et Psychiatrie de l'Hôpital de l'Enfant-Jésus.

TABLEAU I

MOUVEMENT GÉNÉRAL DE LA SECTION PSYCHIATRIE DE L'HÔPITAL



(forme dépressive) les dépressions simples dans l'ordre de fréquence. Nous pouvons difficilement ajouter la manie dans cette courte énumération des syndromes qui ont bénéficié d'e.c., car nous en avons peu vus dans l'hôpital général, et par ailleurs, depuis l'avènement du Largactil nous l'avons utilisé de préférence.

Depuis 1950, et jusqu'au mois d'octobre 1956, 1,974 malades furent hospitalisés dans le service, et 25% de ces malades furent soumis à l'électroplexie. Nous ne tenons pas compte de la consultation externe dans le présent travail, et bien que quelques malades furent traités de façon ambulatoire, les tableaux 2 et 3 n'englobent pas ces malades.

La moyenne individuelle de traitements est de 5.1 et ceux-ci varient de 1 à 17. Seulement 37 de nos malades furent transférés en milieu fermé en cours de traitement. Statistiquement la Chlorpromazine ne parait pas modifier le nombre des transferts. C'est le groupe des psychoses suraigues et des schizophrénies que nous ne pouvons garder en milieu ouvert.

Enfin le temps d'hospitalisation des malades soumis à l'électroplexie se compare à celui d'autres spécialités; la moyenne fut de 22.9 jours en regard de 17 jours pour l'ensemble des malades psychiatriques. Ce temps n'est pas nécessairement en fonction du nombre d'électrochocs mais englobe le temps de latence pour diagnostic, épreuves thérapeutiques autres et une courte période de convalescence. L'emploi du Curare déjà signalé, nous permet d'étendre cette thérapie à certains handicapés physiques pour lesquels les traitements présentaient un réel danger autrefois. Nous bénficions du concours des anesthésistes dans ces cas. Pour

TABLEAU II

Année	Nombre hospitalisés	Nombre à E.C.	% soumis à E.C.	Moyenne e.c. par cas
1950	204	24	11.7%	5.5
1951	261	30	11.4	5.2
1952	220	57	25.9	4.8
1953	247	89	36.03	5.5
1954	265	92	34.7	4.4
1955	384	112	29.1	5.
1956 (9 ms)	393	95	24.17	5.6
Total	*1,974	499	25.2	5.1

*Ce nombre ne comprend pas la consultation externe.

ces malades, la moyenne individuelle de traitements est de 5.9, et la durée moyenne d'hospitalisation à 24.4 montre une augmentation très minime et négligeable. Tant qu'aux résultats, ils sont statistiquement légèrement meilleurs; il faut voir ici uniquement le jeu du syndrôme, c'est-à-dire des malades où l'électroplexie est plus strictement spécifique.

Les résultats sont dans l'ensemble très bons, puisque 82.3% de nos malades quittent l'hôpital améliorés, très améliorés ou guéris. L'évaluation de l'état à la sortie est difficile et nous sommes très objectifs, parfois même un peu trop sévères; ainsi combien de malades sortent de l'hôpital avec la mention "amélioré" plutôt que "guéri", simplement parce que persiste une amnésie post-électrochocs inévitable mais éphémère. C'est en considération de ces faits que nous évaluons nos résultats comme très satisfaisants. 10.5% des malades n'ont pas bénéficié de l'électroplexie et 7.2% furent transférés en milieu fermé.

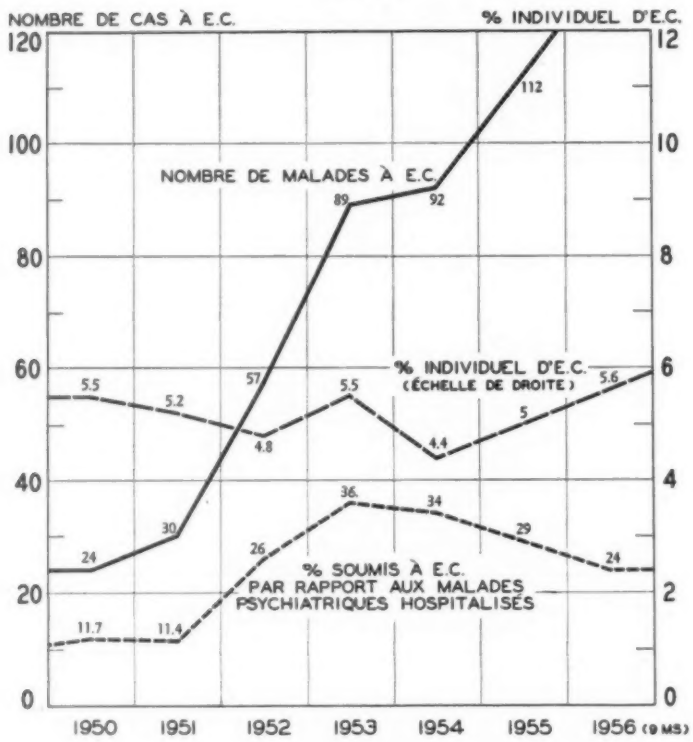
Il est difficile parfois d'apprécier dans certains cas si nous sommes en présence d'une rechute ou d'un nouvel accès. Nous considérons comme étant une rechute, la réhospitalisation qui se présente en dedans de douze mois; nous tenons compte également du diagnostic, des circonstances et de l'évolution. Dans ces conditions 47 malades après un nombre insuffisant de traitements sont revenus à l'hôpital compléter leur cure, soit 8.3%.

En regard de ces données et des graphiques qui les illustrent, quelques courts commentaires s'imposent.

On aura peut-être remarqué combien peu d'enfants ont été soumis à l'électroplexie, quatre en tout de 10 à 16 ans d'âge. C'est que d'abord, et en autant que faire se peut, selon un plan d'ensemble conçu il y a déjà plusieurs années, nous les orientons vers le Centre Médico-Social de Québec. Et cela, en rapport avec notre conception de la thérapeutique habituelle de ces cas. Nous croyons, en effet, que vis-à-vis des enfants les mesures les plus appropriées consistent en procédés somato et psycho thérapeutiques complétées par un apport médico-pédagogique. C'est, à notre avis, de cette façon que l'on peut espérer les meilleures chances de succès, par travail d'équipes, sous l'égide du médecin, et nous nous en tenons à cette ligne de conduite générale.

A l'extrémité opposée, en ce qui a trait à la psychiatrie gériatrique, nous réservons les traitements par électrochocs, généralement parlant, pour les cas

TABLEAU III



où domine surtout un état confusionnel, et préférablement, mais non nécessairement, avec accompagnement de tendances dépressives. Bien entendu, nous apportons un soin particulier à l'évaluation des états cardio-vasculaire, ostéologique et de nutrition générale chez les vieillards. Cette attitude de notre part, semble nous avoir donné les meilleurs résultats immédiats et éloignés, sans incident fâcheux.

Le mode de traitement par l'électroplexie, pour empirique qu'il apparaisse à quelques-uns, comporte, pour le malade des composantes psychologiques très importantes que nous nous efforçons de ne pas minimiser dans notre esprit, tout en y mettant la note de psychothérapie suggestive qui est à propos.

Ainsi, nous sommes convaincus de la nécessité, avant les traitements, des questionnaires et entrevues effectués, seuls avec le malade et dans un endroit où s'imposent le calme et la tranquilité, conditions nécessaires pour la détente.

Autant nous sommes convaincus aussi que les malades psychiatriques en hôpital général doivent être séparés les uns des autres et non pas groupés dans des sections ou "unités" (ou même pavillon), autant nous croyons que l'endroit des traitements par électrochocs doit être préférablement isolé d'abord, et, de plus, à peu près inconnu des autres malades de l'hôpital. Pour le malade lui-même qui subira les traitements, cet apport d'ordre psychologique est capital, en ce qui concerne les heurts possibles de son "ego", et l'idée d'infériorité que peut exagérer une telle notion du "comme les autres"; quant aux "autres", on

TABLEAU IV

Etat à la sortie:

Année	Guéri	Très amél.	Amélioré	Idem	Transfert*
1950	5	0	15	3	1
1951	3	2	16	4	5
1952	6	8	32	4	7
1953	19	12	43	10	5
1954	27	18	28	11	8
1955	30	24	37	13	8
1956 (9 ms)	17	26	40	9	3
Total	107 (21.40%)	90 (18.03%)	211 (42.28%)	54 (10.81%)	37 (7.39%)

*Transfert en milieu spécialisé.

évite ainsi les réactions de pitié, d'effroi ou d'inacceptable qu'autrement on ne manque pas de retrouver.

Dans notre milieu hospitalier, les conditions de travail et de lieu, maintenant instaurées, respectent ces éléments de psychologie fondamentale.

Dans la salle même du traitement, et au moment de son application, nous nous efforçons de réduire, au strict minimum nécessaire, le nombre des personnes présentes. Et si, pour fins d'enseignement et d'expérience à acquérir, la présence de stagiaires ou d'internes est requise, ce n'est qu'un seul à la fois qu'ils y sont admis, avec la précaution d'être présentés au malade à titre d'aides, ce à quoi, effectivement, ils doivent être employés.

Nous n'avons pas dressé de graphiques comparatifs en ce qui touche l'électroplexie donnée seule ou accompagnée d'anesthésie, de curarisation ou de sédation. C'est que les commentaires seraient négatifs au point de vue de l'importance comparative des résultats. L'élément phychologique entre surtout ici en ligne de compte, et là est l'importance de l'application de ces méthodes adjuvantes.

Enfin, sur un plan plus général, nous nous contenterons de terminer en déclarant brièvement que l'évolution sociale et des sciences médicales nous fait tous les jours, pour ainsi dire, toucher du doigt, le vaste champ d'action de la médecine psychiatrique dans l'hôpital général; que les évènements et l'expérience acquise démontrent son intégration active dans la pratique de la médecine; que la rencontre et le traitement de ces cas n'est plus du domaine seul de "l'aliéniste", tel qu'antérieurement compris ou entendu, mais touche le médecin dans ses activités habituelles; et que si la thérapeutique spéciale est du domaine du médecin-psychiatre, le traitement général — ou global — requiert un travail d'équipe pour le plus grand bien du malade.

Finalement, quant à nous, nous nous efforçons de tenir un juste milieu, autant dans nos notions que dans nos façons de traiter, entre les concepts de psychogénèse, d'organicisme et de "dynamicisme", nous efforçant de nous souvenir qu'il semble bien difficile de séparer le contenu du contenant, et que l'être humain, dans son ensemble intellectuel, affectif, physique et social — mais sans oublier un des éléments — doit être le sujet de nos attentions, de nos sollicitudes et de nos préoccupations.

SUMMARY

The authors present a review of their seven years experience with electroshock treatment in a general hospital.

At first they briefly recall their ecletic approach toward the diagnosis. For instance they insist on the difficulty of differentiating a neurotic depression with anxiety from an endogenous depression and stress the usefulness of the Funkenstein and the sodium amytal tests.

Since 1950, 1,974 patients were treated in their service, of this number, 25% only with E.C.T. The average number of treatments by patient was 5.1.

The percentage of improved cases is 82.3%, and of relapses is 8.3%.

They do not segregate their patients in a special section of the hospital, instead they try to treat them, as far as possible like ordinary general hospital cases. Their treatment room is a quiet and seclusive place, and every treatment is given very discreetly, so in the hospital this place has not the reputation of the "shock room".

They concluded in emphasizing the multidimensional approach in psychiatric treatments.

Editorials

TELEVISION

We hear frequently from our patients of the impact upon them, for better or for worse, of this or that television programme. Occasionally too, we hear expressions of interest or concern from psychiatrists about the effect of this medium on the mental well-being of the populace. That the increasing commitment to television as a form of entertainment, education, escape or relaxation has mental health implications, few psychiatrists doubt.

These effects are possibly minor and peripheral to the major problems of mental illness, but bring to mind interesting questions. For example, what are the effects of programmes specifically designed to increase awareness of psychiatric services, or to inculcate positive mental hygiene teachings as part of a public education scheme? Conversely, what are the detrimental results of themes which portray mentally ill persons in an unrealistic manner or exhibit persons in real distress being treated in a superficial, magical or superstitious manner? What is the mental health value of the solutions offered to dilemmas in the family life often portrayed in domestic serials such as the "Plouffe Family" or "Father Knows Best". Do such programmes contribute to the establishment of cultural norms and mores.

Another more basic research opportunity is presented for a study on the response of patients with differing types of personality organization to the standard stimulus presented in frequently seen "Psychological dramas" which often enact common conflictual situations with considerable emotional force.

Lastly we have learned (Arch. Neurol. – Psychiat. **77 57** 1957) of a study of the effectiveness of therapy administered via closed circuit television in a mental hospital. Those who pin their therapeutic faith on the curative benefits of human contact may shudder and the devotee of organic tinkering with the brain may scoff, but the possibility of utilizing the method warrants further investigation and controlled experiments. We would like to think that some of the manufacturers of television equipment or the larger producers, would consider making grants to support such studies.

INFLATION

Of late, we have read much of the pros and cons concerning the constructive potentialities and possible dangers of the economic inflation which is once again evident in Canada. Even had we the expert competence, this would be an inappropriate place to debate this fiscal dilemma. However, we cannot help but observe the parallel with the current situation regarding manpower in the field of psychiatric services.

There is a dangerous shortage in Canada of trained personnel – psychiatrists, nurses, social workers, psychologists and occupational therapists who are required now to fill existing vacancies in already established services. With the growth of communities, even to provide services at the same inadequate level as at present, might well absorb a significant proportion of trained workers entering the field each year. Population increase alone would lead us to anticipate requirements for an increment of twelve to fifteen psychiatrists per year in Canada. (In addition, probably double that number are lost annually from active practice by death or retirement).

In the meantime the demand for personnel increases. Every province and community with proper concern for the welfare of its people is planning and extending its services and thereby creating new positions. The impact of knowledge arising from psychiatric experience has spread to all medicine and welfare, increasing the call for social workers, psychologists and occupational therapists in family centres, rehabilitation units, general hospitals and reform institutions. Concurrently, research is becoming recognized as vital, and institutes are being developed which, it is hoped, will provide career opportunities for suitable workers.

We share a certain pride in the growth of the country and in the progress of health services. We are heartened also by the recognition of the value of the therapists of psychiatry and of a more equitable remuneration for their labours. We would not see it otherwise but would like to see a critical corporate awareness in two areas. First that we be cautious lest we unwittingly develop a predatory competitiveness between various organized health services – hospitals, universities and clinics, which will force salaries to unreasonable heights or lead to a lowering of qualifications. Secondly that we should learn more of the manpower potential from which we recruit personnel. These two points are not unconnected but, in fact, are dynamically and complexly related.

Mental health services are not alone in this predicament – teaching, electronic engineering, dentistry and nursing are examples of professions in a similar state. Nor do we think that such social problems have simple solutions in democratic states. As well as assessing the changing requirements for professional staff in our own field, we can lend the weight of our opinion to ensuring that all young people with capabilities and interests have an opportunity to realize their goals in any socially valuable endeavour.

Editorial Note: Since this editorial was written our attention has been drawn to a report published in the American Psychologist (Vol. 12, Feb. 57, page 57) which substantiates the points raised above with considerable supporting evidence. This paper is recommended reading for all psychiatric administrators.

Programme

CANADIAN PSYCHIATRIC ASSOCIATION

ANNUAL MEETING

MacDonald Hotel, Edmonton, Alberta
Friday and Saturday, June 21, 22, 1957

FRIDAY, JUNE 21st

SCIENTIFIC MEETING

9.00 a.m. President's Greeting

9.15 a.m. "*Treatment of Memory Deficits in the Aged*"
Dr. D. Ewen Cameron – Montreal
Discussant – To be announced

9.50 a.m. "*Psychiatry and Criminal Law*"
Dr. J. C. Thomas – Vancouver
Discussant – Dr. J. M. Byers, Ponoka

10.25 a.m. "*Patient Movement in Psychiatric Hospitals*"
Dr. A. Richman – Montreal
Discussant – Dr. B. F. Bryson, Port Coquitlam

11.05 a.m. *Round Table* "*Psychiatric Teaching*"
Moderator – Dr. D. G. McKerracher, Saskatoon
Dr. R. O. Jones, Halifax
Dr. G. A. Davidson, Vancouver

2.00 p.m. ANNUAL BUSINESS MEETING
Chairman–Dr. C. H. Pottle,
President, Canadian Psychiatric Association

6.30 p.m. RECEPTION AND ANNUAL DINNER (Informal)
Members, wives and guests
Guest Speaker–Dr. Stanley Smith,
Department of Psychiatry,
University of Alberta

SATURDAY, JUNE 22nd

SCIENTIFIC MEETING

9.00 a.m. "*Emotional Factors in Coronary Occlusion*"
Dr. B. M. Dlin – Vancouver
Discussant – Dr. Kenneth Hamilton

9.30 a.m. "*Psychiatry in a General Hospital Without a Special Psychiatric Unit*"
Dr. Yves Rouleau – Quebec
Discussant – To be announced

10.05 a.m. "*The Dying*" Psychodynamic Research
Dr. D. Cappon – Toronto
Discussant – Dr. Julius Guild – Edmonton

10.40 a.m. "*The Impact of Myerian Psychobiology and Psychoanalytic Theory and Practice in the Development of Child Psychiatry in Great Britain*"
Dr. W. C. M. Scott – Montreal
Discussant – Dr. A. Ralph Schrag – Edmonton

11.00 a.m. "*Marital Counselling*"
Dr. Frank E. Coburn – Saskatoon
Discussant to be announced

11.40 a.m. "*Psychiatric Aspects of Disaster*" (Springhill Mine Explosion)
Dr. Robert J. Weil – Halifax
Discussant – Dr. James S. Tyhurst – Montreal

Meetings of the Board of Directors—Canadian Psychiatric Association

Thursday, June 20, 7.30 p.m. Edmonton–Place to be announced

Saturday, June 22, 1.30 p.m. Edmonton–Place to be announced

LADIES' ENTERTAINMENT PROGRAMME

Friday, June 21st–Luncheon (Ladies) 1.00 p.m.

Friday, June 21st–Dinner 6.30 p.m.
–Cocktails at the home of Dr. and Mrs. S. Spaner, following dinner

Saturday, June 22nd–Coffee together, followed by a visit to the Provincial Auditorium, Edmonton

Saturday noon and afternoon – Free

CANADIAN PSYCHIATRIC ASSOCIATION RECEPTION AND DINNER

Friday, June 21st, 6.30 p.m.

Guest Speaker: Dr. Stanley Smith, Department of Psychiatry, University of Alberta

Dinner tickets will be on sale at the Registration Desk in the MacDonald Hotel. The price of the tickets will be $5.00 each (including cocktails).

In order that the Chairman of the Program Committee may plan for the number of guests attending the reception and dinner, it is requested that you fill out the form below and mail it to him at an early date.

Dr. Randall R. MacLean,
Provincial Mental Hospital,
PONOKA, Alberta.

I plan to attend the Annual Reception and Dinner of the Canadian Psychiatric Association and would like to have ..... tickets reserved for me.

.....
Name

.....
Address

PERPHENAZINE

OBSERVATIONS ON THE CLINICAL EFFECTS OF A NEW TRANQUILLIZING AGENT IN PSYCHOTIC CONDITIONS

C. H. CAHN, M.D. AND H. E. LEHMANN, M.D.*

The value of the phenothiazine derivative chlorpromazine which was introduced into clinical psychiatry about five years ago has now been well established. Various other phenothiazine derivatives have since been studied systematically in the search for new compounds of potential clinical usefulness. One of these is perphenazine.** Promising results with a group of geriatric patients have recently been reported with this drug. (1)

Chemistry

Perphenazine is an amino derivative of chlorphenothiazine designated as: 1-(2-hydroxyethyl 1)-4-(3-(2-chloro-10-phenothiazyl)-propyl) piperazine. It is a white crystalline solid, soluble in organic and inorganic acids.

Pharmacology (2, 3)

Based on the lethal dose, perphenazine is somewhat less toxic than chlorpromazine. LD_{50} of perphenazine by the intravenous route for mice is 37 mgm/kgm, for the rat 38 mgm/kgm, and for the dog 51 mgm/kgm. Corresponding LD_{50} for chlorpromazine are 28, 28, and 30, respectively. Both chlorpromazine and perphenazine in toxic doses administered intravenously produce death from respiratory arrest with tonic-clonic convulsions.

Perphenazine possesses considerable local anaesthetic activity in the guinea pig. It also produces irritation of the tissues when injected subcutaneously or intramuscularly. The irritation is equivalent to that produced by chlorpromazine in equal concentration.

Perphenazine is an active inhibitor of non-specific cholinesterase. In this respect, perphenazine and chlorpromazine are approximately equal in activity. Perphenazine, however, in contrast to chlorpromazine, is a more potent inhibitor of specific cholinesterase. The physiological or clinical implications of this finding are unknown at the present time.

Perphenazine shows slight anticholinergic activity and only very slight antihistaminic effects.

The drug is equal to chlorpromazine in potentiating barbiturate anaesthesia in mice. When observing the behaviour of animals under the effects of perphenazine, it was noted that the oral administration of 1 mgm/kgm produced a slight change in behaviour in the mouse, rat, cat, dog, and monkey. Three mgm/kgm consistently brought about marked depression of behaviour, that is, inhibition of spontaneous activity, and of responsiveness. These effects were less pronounced in the cat than in the other species. The tranquillizing activity of perphenazine is about six times as great as that of chlorpromazine.

Perphenazine is also about 7 times as active as chlorpromazine in inhibiting the conditioned avoidance response in the rat without depressing the unconditioned response.

In anaesthetized dogs, perphenazine resembles chlorpromazine in producing mild hypotension, transient tachycardia, and slight adrenergic blockade when given in small doses. In larger doses, both drugs produce reversal of epinephrine effect. Both chlorpromazine and perphenazine cause cardiac stimulation and

*From the Department of Psychiatry, McGill University, and the Verdun Protestant Hospital, Montreal (Dr. George E. Reed, Medical Superintendent).

**The authors wish to thank Schering Corporation Limited of Montreal for generous supplies of perphenazine, the trade mark of which is "Trilafon".

peripheral vasodilatation. No significant changes were observed in the electrocardiogram of dogs with either drug.

Perphenazine is highly active against apomorphine induced emesis in the dog. (4).

In prolonged toxicity studies (6 months) in the rat, no significant gross or microscopic pathology was noted. Some suppression of growth was recorded at high doses in the drug treated animals. All animals appeared to develop some tolerance to the depressant effects of the drug. After 6 months of oral administration of 4 mgm/kgm of perphenazine to dogs, no abnormalities of blood, kidney or liver functions have been observed. These studies will be carried on for one year.

Amphetamine sulfate possesses satisfactory antidote action in shortening hypnosis and lengthening the induction time of hypnosis. The transient slight hypotensive action of perphenazine may be counteracted by nor-epinephrine, but epinephrine is contra-indicated because its normal pressor action may be reversed by the adrenergic blocking action of phenothiazine derivatives.

Psychophysiological Observations

The psychophysiological action of perphenazine was studied by means of a test battery developed by one of the authors for the examination of phrenotropic agents and described in a previous presentation. (5)

In the field of perception the critical flicker fusion frequency was decreased and the susceptibility to perceive after-images increased in healthy volunteers three hours after the oral administration of 20 mg of perphenazine. Of the motor functions tested simple reaction time was significantly increased by the drug. These findings reflect changes in fundamental perceptual functions one of which is typically found with cerebral depressants (critical flicker fusion frequency decrement) and another which is more frequently associated with the effects of cerebral excitants (after-image susceptibility increment). Characteristic of cerebral depression is the slowed psychomotor functioning as reflected in increased reaction time. Another test finding more indicative of cerebral stimulation than depression is the improved learning and psychomotor capacity reflected in better performance in the digit symbol substitution test following the administration of perphenazine.

This drug appears to have an immediate action on the intact central nervous system which resembles a mixture of inhibitory and excitatory effects with a preponderance of inhibition.

Selection of Patients

Eighty-four female patients at the Verdun Protestant Hospital were selected for the administration of perphenazine.

Twenty-six of these patients had an onset of severe acute psychiatric disturbances within one month before the start of perphenazine therapy. These will be referred to as the "acute" patients. Several of these had actually been ill for longer periods but their symptoms had been comparatively mild.

The remainder were mostly chronic schizophrenics (70%) who had been ill for periods ranging from 3 months to 37 years with an average duration of psychotic symptoms of 12 years. These will be referred to as the "chronic" patients. Many of these had shown slight to moderate improvement with previous chlorpromazine therapy and were, in fact, receiving maintenance doses of the latter drug up to the time the present project was begun. 15 chronic patients had not had any tranquillizing medication.

The patients' ages ranged from 15 to 80 years, average 44 years. The diagnostic distribution of the patients is shown in Table 1.

TABLE 1

Results of Perphenari Treatment in Various Severe Psychiatric Disorders

	Recovered	Much Improved	Improved	Controlled	Unimproved	Total
Manic						
Acute	7	1	–	–	–	8
Chronic	–	2	–	1	–	3
Depressed						
Acute	–	–	–	–	4	4
Chronic	–	–	–	–	–	–
Schizophrenic						
Acute	5	2	1	–	3	11
Chronic	–	1	17	15	9	42
Paranoid						
Acute	1	1	–	–	–	2
Chronic	–	–	2	1	–	3
Dementia paralytica	–	–	–	2	–	2
Senile Psychosis	–	–	–	–	2	2
Post-traumatic Personality Disorder	–	–	–	1	–	1
Epilepsy with Psychosis						
Acute	1	–	–	–	–	1
Chronic	–	1	–	–	–	1
Mental Deficiency with Psychosis						
Acute	–	–	–	–	–	–
Chronic	–	–	–	–	2	2
Alcoholic Psychosis	–	–	–	–	1	1
Pathological Personality	–	–	1	–	–	1

Setting

The acute patients were treated on the closed admission ward in the beginning. There they were together with about 40 other patients. The social atmosphere on this ward is structured on the assumption that controlled permissiveness is a constructive therapeutic factor. Extensive personal interaction is promoted in this area, including group therapy twice a week. The ratio of nursing personnel to patients in this ward is 1 : 6.

Within 2 to 4 weeks about half of these patients were transferred to one of three open convalescent wards in the hospital. In these somewhat overcrowded wards the social atmosphere is structured on the assumptions that the patients can take a fair amount of responsibility, can occupy themselves usefully, and can obtain certain privileges as a result of the progress they make. On these three wards five groups are attending weekly group therapy. The ratio of nursing personnel to patients in these areas is 1 : 18.

About one-third of the patients on the admission ward were discharged from the hospital on trial before transfer to other wards had to be considered.

Two patients were transferred from the admission ward to wards for chronic patients, one to a geriatric ward, one to a ward to be described next.

Twenty of the chronic patients were situated in an old building which is one of the several closed wards for continued treatment. On this ward the patients are supervised more closely. The personality of the nurse in charge of this building

determines to some extent the social climate, which is here more authoritarian in nature. The ratio of nursing personnel to patients on this ward is 1 : 17.

Another 20 patients were situated in a still older building, in which the most regressed patients reside. On this ward there is again more permissiveness, it has a small open section for those who are improving, yet the majority of patients there are inactive, autistic, or otherwise deteriorated. The ratio of nursing personnel to patients on this ward is 1 : 13.

The staff and patients on all wards were well accustomed to experimental evaluations of physical and non-physical therapeutic procedures as described in a previous paper. (6) This however does not mean that such investigations were always well accepted. In our hospital, as undoubtedly in many other treatment centres there is always noted a certain hostile skepticism towards the introduction of any new treatment project.

Administration and Dosage

Perphenazine is available for intramuscular (5 mg/cc) and oral administration (tablets). Intramuscular dosage ranged from 15 to 60 mg (0.3 mg/kg to 0.85 mg/kg) a day with no single dose higher than 20 mg (0.3 mg/kg). Oral administration ranged from 8 to 192 mg (0.08 mg/kg to 2.2 mg/kg) a day, divided into 2, 3, or 4 doses.

For the chronic patients, the frequency of administration was the same as previously with chlorpromazine. The acute patients were given the drug four times a day.

The acute patients had several dosage changes, some as many as seven increases being made where the early doses appeared insufficient for symptom control, and decreases made when progress appeared to be satisfactory or side reactions occurred.

The chronic patients seldom had more than two changes in dosage during the 6 months covered by this report. The majority received either 8 mg by mouth 3 times a day or 16 mg by mouth twice a day. No patient received perphenazine intravenously.

Fifteen patients received perphenazine intramuscularly, usually for a period of 3 to 4 days, which was followed by oral administration. 2 patients have consistently refused to take the drug by mouth but have willingly accepted injections over a period of several weeks. Sixty-nine patients received oral medication only, the ward personnel taking special precautions to ensure the actual ingestion of the drug.

To determine the duration of therapy, we were guided by the same principles as govern the treatment with chlorpromazine at this hospital; the acute patients with a short history are treated until 1 to 2 weeks after all symptoms have subsided while those with a history of paranoid symptoms or frequently recurring breakdowns receive maintenance therapy over a period of several months, or an indefinite time.

Physiological Observations

Compared with chlorpromazine, perphenazine caused only slight lowering of blood pressure and no increase in pulse rate in therapeutic doses.

No changes in body temperature were caused by the drug.

EEG recordings of patients who had received perphenazine for more than 24 hours revealed a tendency to increase in synchronicity through a slight lowering of the frequency and increase of voltage.

Haemoglobin levels and leukocyte counts, done once a month, were not affected in our series. Urine sugar, acetone, and bile tests were usually negative

but in two patients choluria was present consistently for eight weeks without symptoms of clinical jaundice; the choluria disappeared spontaneously. Serum alkaline phosphatase, cephalin cholesterol flocculation, serum bilirubin and blood urea nitrogen determinations were performed at regular intervals. These showed no definite pattern of change with the exception of the serum bilirubin level, where a slight tendency to rise appeared.

Side Effects and Complications

When compared with chlorpromazine, the injectable form of perphenazine was much less painful; also no reports of burning or other unpleasant sensations in the gastro-intestinal tract were received where the oral route was used, except for one patient who developed such persistent emesis that treatment had to be discontinued.

By far the most prominent side effect was the extrapyramidal syndrome. Only about 10 per cent of patients showed no evidence of this syndrome, and in over 50 per cent, it was marked enough to require either reduction of the dose and/or addition of another drug to counteract the syndrome. The symptoms tended to appear first after 4-5 days and became progressively prominent. The cogwheel phenomenon was elicited in 80 per cent. A few patients became quite disabled and not being able to feed or dress themselves, were temporarily major nursing problems, apart from feeling quite miserable because of their condition. Two or three weeks later, the extrapyramidal syndrome no longer presented a great problem; however, it was rarely completely abolished as long as the patient continued to receive 16 mg (approx. 0.25 mg/kg) of perphenazine a day or more which most of them did. The drugs used to combat the extrapyramidal syndrome were trihexyphenidyl hydrochloride (artane) 2 mg two or three times a day, diethazine hydrochloride (diparcol) 250 mg two or three times a day, and benztropine methanesulphonate (cogentin) 2 mg two or three times a day. They were considered to be of approximately equal effectiveness.

Other side effects were relatively uncommon. Drowsiness was mentioned by a few and dizziness by some others; one patient became markedly ataxic. Constipation, although not usually complained of, was probably present in a considerable number. Amenorrhea was a complaint of one patient but may have been due to emotional causes. Usually there was a gain of weight during the first week. Loss of weight occurred in some patients after 10-25 days especially in those whose self-feeding was interfered with by the extrapyramidal syndrome. Most patients' weights after the third month were not markedly different from the start.

Two patients developed transient drug rashes, after 17 days and 27 days, respectively. The medication was discontinued in the first patient and her rash disappeared within two weeks; the rash of the second patient lasted only one day and her medication was not changed.

The incidence of seizures (petit mal and grand mal) was increased in one epileptic patient while receiving the drug – this was easily counteracted by increasing the anti-convulsant medication that was given simultaneously.

A number of patients whose course of perphenazine therapy was discontinued and who were immediately changed to equivalent doses of chlorpromazine showed some untoward effects, i.e. weakness, dizziness, nausea and headache preceded in a few by paroxysmal yawning. These symptoms disappeared when the chlorpromazine was discontinued for a few days.

There were two deaths in our series. Both patients had presented special therapeutic problems before they were given perphenazine.

The first patient was a 46 year old chronic schizophrenic who also had hypertensive cardiovascular disease and marked obesity. Congestive heart failure had been imminent for some time and made its clinical appearance about a month after perphenazine therapy had been started. In spite of digitalization the patient died on the fortieth day. The cause of death was considered to be cardiac decompensation due to chronic hypertensive cardiovascular disease. The dose of perphenazine had been only 8 mg (0.07 mg/kg) orally twice a day. Consent for autopsy was refused. This patient had a poor prognosis from the beginning and it was felt that the cause of death was unrelated to the administration of the drug in this case.

The other patient, aged 50 years, also very obese, had a paranoid post-alcoholic psychosis and was a constant severe management problem. She had been receiving paraldehyde daily for over two years. When this drug was discontinued she became extremely aggressive and assaultive. For two days she was given chlorpromazine intramuscularly without any reduction of her excitement. Then the patient was placed on perphenazine 10 mg (0.08 mg/kg) plus reserpine 5 mg (0.04 mg/kg) intramuscularly twice a day. This combined drug therapy was continued for five days during which period of time the patient became a little more manageable but remained agitated and resistive though not confused. On the fourth day some mild extrapyramidal symptoms appeared. She died suddenly in the afternoon of the fifth day. Autopsy showed only moderate cirrhosis of the liver associated with the old alcoholism and did not reveal the cause or the mode of death.

Results

Of the 26 "acute" patients, eight were manic or hypomanic at the beginning. The presenting symptoms of excitement, overactivity, overtalkativeness, and insomnia either disappeared entirely or became insignificant within a week. Medication was discontinued in seven patients after 3 to 4 weeks, and none of these patients relapsed within the next three months. In one patient the drug is being continued for several months because of her rather unstable personality.

Four manic-depressives were depressed at the time perphenazine therapy was begun. They remained depressed or became more depressed, and the drug was discontinued after 1 to 8 weeks. They all recovered subsequently with electroconvulsive therapy.

Of the 11 "acute" patients with schizophrenic reactions, 5 recovered, 2 were much improved and 1 was improved within 2 to 4 weeks.*

Three patients did not improve rapidly; 2 changed very little within three weeks and were subsequently treated with coma insulin therapy; 1 of them was discharged much improved, the other one is making satisfactory progress.

One patient was unchanged with medium doses of perphenazine for a few weeks and subsequently improved with chlorpromazine in high doses.

The "acute" patient diagnosed as epilepsy with phychosis responded favourably. The visual and auditory hallucinations which had been very disturbing to her disappeared entirely and have not recurred. This woman has been discharged home on maintenance therapy with perphenazine as well as anti-convulsants. Four continued on maintenance therapy with the drug. This was not deemed necessary in two others, owing to their good premorbid personality. The remaining two patients should have continued on maintenance therapy, but did not do so for technical reasons. Our results with perphenazine in the chronic as well as the acute patient group are shown in Table 1.

*"recovered" means cessation of all symptoms; "much improved" means sustained reduction of symptoms to the point where the patient may be discharged from hospital; "improved" means sustained reduction of symptoms but not to the point where the patient is able to leave the hospital; "controlled" means reduction of symptoms only for the duration of treatment.

Discussion

In setting up the design for this investigation, we gave serious consideration to the establishment of a control series. We decided against employing double-blind or other simultaneous control devices for the following reasons: double-blind studies with drugs producing obvious side effects (extrapyramidal symptoms, flushing, drowsiness, etc.) are almost from the start doomed to failure unless a placebo capable of producing similar side effects is given. This would render the procedure rather cumbersome, to say the least, and would give rise to strong doubts regarding the methodology of the experiment since such powerful placebos may well have therapeutic effects of their own.

Neither did it seem to be imperative to us to use a single-blind procedure in which only the patient is unaware of the nature of the drug administered because a variety of informal yet reliable control measures are available in a setting such as ours for this experiment so that its results may be checked against them. To be more explicit:

(1) the investigators and the nurses had known all patients through frequent personal contacts, some of them for many years;

(2) the majority of the patients under study had received a considerable variety of other treatments in the past and we could match each patient's response with his previous responses;

(3) a great number of other patients in this hospital, well matched to the group under study, had concurrently been treated by other therapeutic procedures or had received no specific therapy.

These other patients could well be considered a control group although they were not given the same formal attention as the patients in the experimental series.

We did not select any male patients for this investigation because another evaluative study was simultaneously underway among our male patients. The fact that we restricted our sampling to female patients only does not mean that we would necessarily have obtained the same results with male patients. But although differences in therapeutic effectiveness of drugs in relation to the sex of the patients have been reported (though not yet confirmed), we feel such differences, if present, would only be slight.

Ideally, one would have chosen patients who had not received other pharmaco-therapy for at least a year or two prior to this study. As every investigator knows, however, this is practically an impossibility nowadays where very few patients remain, even in large hospital settings, who have not been exposed to drug therapy for varying lengths of time. We had already observed during previous experiments that patients who had been receiving an effective tranquillizing drug would rapidly become disturbed if this drug was either discontinued or replaced by a less effective agent. We could therefore assume that those patients who had been receiving another tranquillizing drug (chlorpromazine or reserpine) immediately prior to the administration of perphenazine would become more disturbed in their behaviour within a few days if perphenazine proved to be less effective than the drug they had been receiving. Continued improvement, on the other hand, would not necessarily mean that the new drug was more effective than the one they had received before because it is well known that in chronic psychiatric patients, improvement with pharmacotherapy may continue gradually over an extended period of time.

In this connection, it should be stated clearly that we do not consider this experiment as conclusive in regard to the ultimate therapeutic possibilities of perphenazine, as we are convinced that any pharmacotherapeutic procedure in

chronic psychiatric patients cannot be definitely evaluated before one or two years of continued therapy have elapsed. By the same token, we are inclined to consider distinct improvement in a chronic psychotic patient taking place after only two or three weeks of pharmacotherapy as being due to other factors inherent in the treatment situation but probably not related to the effect of the drug.

Our clinical observations as regards the potency of perphenazine are in agreement with the pharmacological observations in animals where the effective ratio of perphenazine to chlorpromazine was observed to be 1:6 or 1:7. The therapeutic doses of perphenazine in the treatment of psychotic patients were in the same order, namely, usually one-sixth or one-seventh of an equally effective dose of chlorpromazine.

Therapeutic results with perphenazine in acute psychotic conditions were as satisfactory in our sample as we would have anticipated with chlorpromazine.

Of 11 acute schizophrenic patients, 5 recovered and 2 were much improved within 4 weeks, which means that 60% of these acute patients were ready to leave the hospital within a month after being admitted.

Of the 8 acute manic patients, 7 had become asymptomatic within a month.

The drug is not effective in endogenous depressions and may even intensify depressive symptoms in our experience.

Of the 42 chronic schizophrenic patients, 18 (43%) were definitely improved and another 15 (36%) temporarily improved, that is controlled, with perphenazine. Only 9 (21%) failed to show a favourable response. These figures include those patients who had already started to show improvement with other pharmacotherapeutic agents prior to the administration of perphenazine so that one may assume that perphenazine is either responsible for this improvement or is at least capable of maintaining it.

Our small sample does not permit us to draw valid conclusions as to the likelihood of certain complications such as jaundice or agranulocytosis which were not observed in our series but might occur in a larger group of patients. Extrapyramidal symptoms appeared to occur more frequently and earlier in the course of therapy than with chlorpromazine. Although always completely reversible, they were at times so severe that they required symptomatic measures to counteract them. The incidence of allergic reactions in our series was lower than with chlorpromazine. The causes for the one death in our series which may have been related to the drugs administered were unfortunately obscured by the fact that we made a methodological error in combining a potent new drug in the process of investigation with another potent drug, reserpine, without possessing either information on, or experience with, the effect of such a combination. Our only justification was the fact that this patient had presented unusual difficulties both with regard to being a danger to herself and others, and because she had proved refractory to other therapeutic procedures.

In future, we would avoid combining perphenazine with reserpine, and we would also be inclined to consider marked obesity as an added risk.

In addition it would seem to be wise to be careful with the administration of another drug for a few days after perphenazine has been discontinued.

With these precautions in mind, we feel that perphenazine is a useful and safe pharmacotherapeutic agent in the treatment of acute and chronic psychiatric disorders.

Summary

1. The planning and results of an investigation of perphenazine, a new phenothiazine derivative have been presented; this study was carried out with 84 psychotic patients in a mental hospital.
2. The chemistry, pharmacology and psychophysiology of this drug are briefly described, as well as the selection of patients, the setting, administration and dosage.
3. The clinical results were similar to those one would expect to obtain with chlorpromazine, using one-sixth to one-seventh of the dose of chlorpromazine. Good to excellent results were observed in acute psychotic states except depressions. Perphenazine is also a potent therapeutic agent in the management of chronic psychotic patients.
4. Untoward reactions may occur if perphenazine is combined with large doses of reserpine, or patients are immediately changed from perphenazine to chlorpromazine. Caution might be indicated with the use of the drug in obese patients.
5. The principal clinical differences between perphenazine and chlorpromazine as observed in our series were: more frequent and earlier extrapyramidal symptoms (well controlled by various anti-Parkinsonian drugs), fewer autonomic and allergic side effects, less drowsiness, and less pain on intramuscular injection.

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Résumé

1. Nous avons décrit l'organisation et les résultats, d'une étude de la perphénazine, un nouveau dérivé de la phénothiazine. Les travaux furent conduits dans un hôpital mental, sur 84 malades atteints de psychose.
2. Brièvement présentés furent la chimie, pharmacologie et physiologie psychologique de cette substance, les facteurs influençant la sélection des patients, et leur entourage; aussi les doses et la façon d'administrer le médicament.
3. Avec un dose de perphénazine allant du sixième au septième en poids, des résultats cliniques équivalents à ceux qu'on attendrait de la chlorpromazine furent obtenus. Ces résultats furent bons à excellents dans les états de psychose aigue, sauf en cas de dépression. En plus, la perphénazine est un agent thérapeutique puissant dans le traitement des malades atteints de psychose chronique.
4. Des réactions indésirables peuvent surgir quand la perphénazine est combinée à de larges doses de réserpine, ou encore chez les malades où un traitement à la chlorpromazine suit immédiatement la perphénazine. Il se peut que l'emploi du médicament chez les patients obèses soit sujet à caution.
5. Les principales différences cliniques observées dans notre groupe entre la perphénazine et la chlorpromazine furent: des symptômes extrapyramidaux plus fréquents et précoces (bien controlés par les différentes médications anti-parkinsoniennes), moins de réactions autonomiques et allergiques, moins de somnolence, et une injection intra-musculaire moins douloureuse.

Re: Canadian Mental Hospitals Institute

The *Canadian Psychiatric Association* and the *American Psychiatric Association* jointly will sponsor a Canadian Mental Hospital Institute to be held at the King Edward Hotel, Toronto, January 20-24, 1958, for Canadian psychiatrists engaged in clinical administration.

The meeting will follow the pattern of the Mental Hospital Institute held each October in the United States, with emphasis on free discussion in plenary and group sessions. Registration will be limited to around one hundred and a fee of fifty dollars charged which will cover banquet, most lunches, etc. The administrative staff work will be carried out by the A.P.A. Mental Hospital Service. The theme of the Institute will be around administration in mental hospitals, including D.V.A., clinics, psychiatric units in general hospitals and special services. Suggestions for discussion topics from members of the C.P.A. through provincial director are urgently solicited.

DR. E. PEARL HOPGOOD

It is with regret we report the death of Dr. Pearl Hopgood, one of Canada's outstanding psychiatrists. Dr. Hopgood retired in 1953 after many years service as Assistant Superintendent of the Nova Scotia Hospital. Dr. Hopgood was also an organizer and supervisor of St. John Ambulance brigades in Nova Scotia and for her outstanding work in this connection she was invested at Ottawa by Lord Alexander of Tunis, Governor-General of Canada, with "Commander of the Order of St. John", the oldest order of chivalry in the Commonwealth. Dr. Hopgood was born at Malpeque, Prince Edward Island, educated at Prince of Wales College and graduated in medicine from Dalhousie University.

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OBSERVATIONS ON A CERAMICS WORKSHOP FOR PSYCHIATRIC PATIENTS*

KARL STERN, M.D., VICTORIN VOYER, M.D., RITA BEAUCLAIR, R.N. AND GILLES DEROME[1]

In every kind of occupation the nature of the raw material, the manual procedure and the setting of group and leader create a definite dynamic pattern. Ceramics, as a form of therapeutic occupation has a markedly dual aspect: on one hand it lends itself to activities of a regressive-primitive connotation (the handling and shaping of wet, soft clay), on the other hand it represents a true craft in the sense of cultural creativeness; on one hand there is the satisfaction of an immediate result (just as in the case of plasticine or of fingerpainting things take shape under our hands within a very short time), on the other hand, with the process of drying and firing, an element of waiting and of patience is introduced. This element of waiting and of uncertainty about the final outcome is particularly striking when it comes to the developmetn of the colours in the glaze. As far as the specific content of the patient's production is concerned there is again a dualism which distinguishes this from other forms of art: here we have to make an immediate choice between expressive and utilitarian objects. Thus it stands to reason that ceramics offers possibilities of a very specific therapeutic and dynamic interest.

In view of all this, it is remarkable that compared with the vast literature on paintings, including fingerpainting, and drawings of psychiatric patients, systematic observations on three-dimensional artistic activities, particularly ceramics, are rare. Fidler's textbook of Psychiatric occupational therapy (1954) presents a detailed discussion of weaving with all its psychological and therapeutic implications but mentions ceramics only in comparison with this, together with other activities. Another recent manual on occupational therapy (O'Sullivan, 1955) mentions "pottery" twice, and only in connection with the material and tools required. An interesting study on the activities of Chronic Schizophrenic patients with soil and soil-like substances has been presented by Wittkower and Latendresse (1954). The following is a preliminary study on ceramics as an occupational therapy for psychiatric patients. Its aim was to study the specific therapeutic mechanism of this activity.

Subjects and Method

The present study comprises observations on eighty-eight patients. No particular diagnostic category was favoured, and the patients represent a fair cross-section of what one would expect in an open psychiatric institution: neuroses, including character problems, alcoholism and drug addiction, and psychoses. The ceramics workshop is one room, especially reserved for this, within the department of Occupational Therapy. The work goes on five times a week for three hours a day, and for most patients in this workshop this is not the only activity. Some work also in the carpentry, or take part in the gymnastics or recreational activities. From the point of view of treatment, the patients represent a cross-section: some are under psychotherapy with or without pharmaceutical aids, others are under physical forms of treatment such as E.C.T. or insulin, or in a phase of psychotherapy following a course of such physical treatments. To almost every patient in the hospital some form of occupational or recreational therapy is suggested but it is left to the patient

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*Read at the APA Regional Meeting, Montreal, November 1956.

to accept or reject the suggestion of any specific form of occupation, including ceramics. The workshop is under the guidance of a nurse (R.B.) and a professor of ceramics (G.D.)

The nurse makes progress notes of every case, and specific observations on the following points:

(1) patient's attitude to the fresh clay

(2) whether the patient prefers to work with his hands or with tools, and his general attitude in handling his hand tools or the potter's wheel

(3) the patient's attitude during the drying period

(4) the patient's attitude towards the firing

(5) the patient's attitude towards the colours and glaze

(6) the choice of objects to be made

(7) attitude towards the finished object as a piece of property

(8) the patient's behaviour within the group and towards the leading figures.

These observations are, as much as possible, correlated with the physician's observations during treatment. For one month one physician (K.S.) participated in the work. About one-third of the patients were treated by physicians of the outside consulting staff. Therefore, the correlation of these observations with dynamic and therapeutic observations refers only to a selected group of patients.

Observations

Attitude towards the material. The attitude of the patient towards fresh clay varied from disgust and revulsion to delight. Some individuals were unable to touch the material, and left the department after one visit, and interpretative attempts were of no avail. Some patients became nauseated in touching the fresh clay, even with a "feeling" of vomiting. Open and hidden references to faeces were frequent. One manic-depressive patient whose problem was one of marked hostility towards his wife, referred continuously to faeces so as to make the other patients laugh, and made imitations of faeces out of clay. An unmarried woman of thirty-five who suffered from an acute paranoid crisis in which she had ideas of reference towards fellow-office workers, ate clay. This woman was neat in appearance, and showed otherwise, with reference to cleanliness and eating, no signs of regression. One woman patient, a schizophrenic, referred to the clay as "dough for cake", was most surprised when she was told about its true nature and refused to accept the explanation. She kept on referring to dough.

In those cases in which an initial revulsion was overcome and the patient learned to "like" the medium, the change was invariably associated with an improvement of the psychiatric condition. In these cases no attempt at interpretation was made. The opposite, namely with psychiatric improvement an increasingly negative attitude towards the medium, was not observed.

A woman of thirty who suffered from a reactive depression superimposed on a severe character disorder exhibited a very striking reaction of disgust towards clay. She refused even to touch it. The most characteristic feature of her present state were "tears of rage". Her depression contained a nucleus of marked hostility which was rather overt. She was seen in daily therapeutic sessions by one of us (V.V.), and after a certain time began to show interest in ceramics. As she improved progressively she not only began to work with the material which she had regarded with so much disgust but she got a curious pleasure

out of handling it. She would dwell for an unduly long time on kneading the wet clay, her arms up to the elbows in it, trying out various mixtures with water. She made numerous ashtrays for her physician, and she was most meticulous about the accuracy of form.

Attitude towards tools. In some cases it was obvious from the beginning that the patient used instruments in order to avoid touching the clay with his hands, and not for the "normal" purpose, namely to finish the object. These were the same patients who made remarks of disgust or nausea. The patient, far from leaving the workshop in disgust (as some others did) took the work up but avoided, as much as he could, direct manual contact. As it might be expected, this was seen mainly in cases of a rigid, compulsive personality or with a paranoid trend.

The Drying Period. This period is interesting from two different points of view. Firstly, it is a phase during which the patient's capacity to wait is tested. Second, it is (like the phase of firing in the kiln) a phase during which the object can become damaged. In the case of drying it may easily accidentally become damaged by others, either by fellow-patients or by the nurse.

Most patients accepted the waiting period associated with drying as a matter of routine. Others seemed to be unable to wait. It is noteworthy that the three most impatient ones were two alcoholics and one drug addict. One alcoholic reproached the nurse for having to wait. In such cases interpretations were given either on the basis of the objective situation or the primary situation to which it referred.

From the point of view of damage to the object during drying period the following case is illustrative.

One patient, a woman of fifty-seven, was under psychotherapy for a depression which was precipitated by the departure of her daughter, an only child, for Paris where she studied ballet. The mother was not only grieved about the daughter's departure but also by the fact that she lived what the mother considered a "Bohemian" life and embraced a libertine philosophy. In the course of the treatment it became obvious that the patient had all her life had a similarly ambivalent attitude towards a younger sister, and that the problem of the daughter represented a revival of that conflict. At a certain phase of the therapy she produced the following dream. "I am sitting with my husband, with my psychiatrist and the psychiatrist's wife at a table in our country home. A lovely meal is being prepared. A wasp appears at the scene and I spend all my time hitting at the wasp in order to chase it away, and by this distraction the lovely meal is spoiled for me." In talking of this dream she spoke of her fear of wasps and of the fact that she was otherwise never afraid of animals, even of snakes. In the subsequent ceramic sessions she made the image of a snake wriggling among flowers. She remarked spontaneously that this was made in allusion to our conversation on fear of animals, and as a future gift for the doctor. During the drying period the snake broke, due to the quality of the clay. The patient suspected some women patients of having done this to her. An interpretation on the basis of the transference was made, and this had a striking therapeutic effect. During that particular therapeutic session she spoke for the first time at length of the sister who had "spoiled" the patient's relationship with the father.

Firing. The firing in the oven is not done by the patients themselves but by the nurse in charge of the workshop. This process of waiting in which the nurse can be made responsible, as it were, for the final outcome, is associated with characteristic reactions. A young man of twenty who was under treatment

Figure 1 Various phallic objects made by different patients. The third from the left in the lower row is an Eiffel Tower made by the patient referred to in the text. The same patient had in a previous phase made crude phallic objects like the ones in the upper row.

for a severe suicidal psychoneurotic depression accused the nurse continuously for everything that happened to his objects in the kiln. The most pertinent elements in his history were those of a timid, subdued father and a rigid, domineering mother who "bossed me and my brother around ever since I remember and she got on our nerves".

One of the alcoholic patients who reproached the nurse for having to wait too long for drying reproached her also for having caused the objects to break during the heating period in the kiln. This man was one of two children of a wealthy couple. There was a history of overprotection and "being spoiled" by the mother. As a young man he ran away to the Army against his parents' wish and joined the commandos. He was in action on D-day. When he came to us there was besides the history of alcoholism a marked overt hostility against his wife and mother-in-law. This same patient, incidentally, used to accuse that same nurse of giving him his drinks too late at a time when she was in charge of the Insulin ward. In this kind of situation interpretation was made, again either on the plane of immediate reality or on the deeper level.

Colouring and Glazing. For those who are not familiar with the technique it should be pointed out that in the process of colouring the original dye is an orange of various shades which appears at the end of the firing as green or blue or red etc., as the case may be. It is hard to imagine, under any circumstances,

Figure 2 A figure of a reclining man in a bathtub, made by a patient during a Reactive Depression (Grief Reaction) with phobic symptoms, following his uncle's death. The reclining encased figure is an expression of his own unconscious identification, with his preoccupation with dying and resurrecting.

that the nearly uniform dye will develop into the varying colours indicated on the label. Patients with latent paranoid or hostile tendencies found it difficult to apply colours whose "face value", as it were, differs from their final appearance. In other words, it was found that the process of colouring tested the patient's sense of reality still more, by an element which was added to the factor of mere "waiting".

Choice of objects. The present study is chiefly concerned with the dynamics of making, rather than the specific psychological *content* of the objects made and its interpretation. As is well known, there is no uniform theory for the choice of objects because this depends on a number of factors, and our observations confirmed this. For example, the choice of simple utilitarian objects such as ashtrays as opposed to representative, expressive modelling may in one case indicate compulsiveness and in another case a tentative approach towards an acceptance of practical reality. Still in another case the choice of concave,

Figure 3 Schizophrenic productions which show the resemblance with primitive art. Compare particularly the first two figures from the left in both rows.

containing objects as compared to convex solid objects has a sexual symbolic implication. Furthermore, both these interpretations are often equally valid on two different planes.

There is an entire group of patients, regardless as to the diagnostic category, who under psychotherapy tend in the beginning towards an expressive, representative kind of modelling, and with improvement change towards utilitarian objects. It is obvious that this too lends itself to interpretations on different levels.

For example, one patient began with crude phallic objects, and as he improved began to make vessels. At the end, shortly before his discharge, however, he made a model of the Eiffel Tower – in other words he returned to the phallic theme but in a stylized and sublimated form (fig. 1). This was a married man of thirty-nine whose depression had been precipitated by a catastrophic event in his hometown, namely the murder of wife and children by a family father who had become acutely psychotic. The patient came to us with insomnia, anorexia, feelings of unworthiness and guilt, and a fear of "doing the same thing" (as that man had done). While under psychotherapy his hostility became overt and it was during that phase that he produced those crude phallic symbols. The

Figure 4 Mask of a witch, made by a compulsive-obsessive, with schizoid features. This patient had fantasies of a domineering, "castrating" mother. These masks have a somewhat two dimensional quality of painting.

vessels were made when his depression had cleared up. The Eiffel Tower was made while he was going into town to look for a job.

A man of twenty-eight who had come in with symptoms of anxiety hysteria which were precipitated by the death of an uncle. Following this event the patient developed obsessive fears of a cardiac death. He had a bizarre way of expressing himself and other features which made his physician suspect a pseudo-neurotic, early schizophrenic action. His ceramics productions in the beginning

Figure 5 Mask made by a schizophrenic patient.

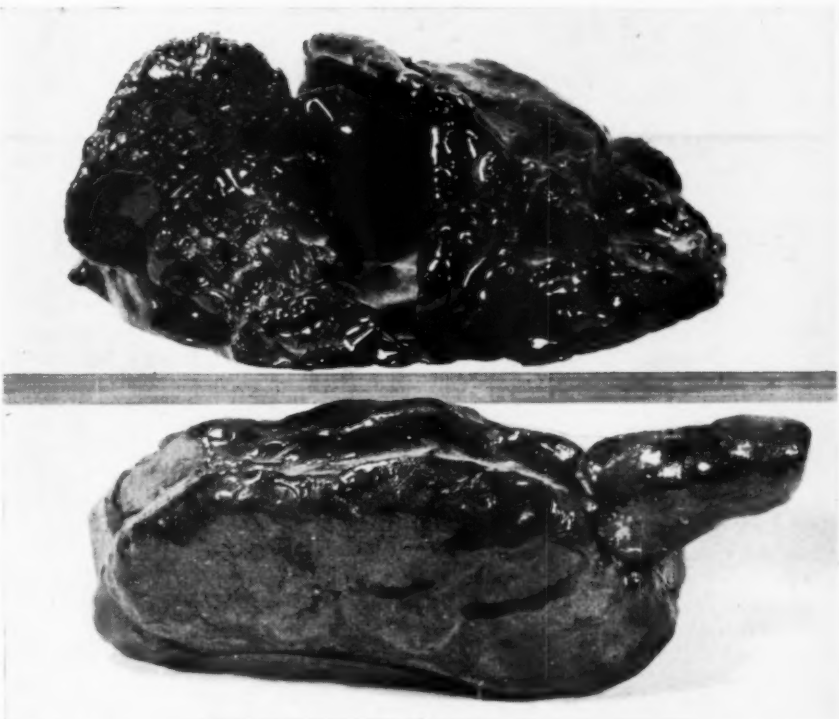

Figure 6 Schizophrenic patient. Upper row: "turtle half-emerging from the shell." Lower row: "dog". Compare the poor quality of form and movement, and the motif of something half-emerging, with similar schizophrenic responses in Rorschach tests.

were highly expressive and rather bizarre such as a man lying in a bathtub (fig. 2). As the therapy progressed he too changed to utilitarian objects. In schizophrenic patients too the change from expressive to utilitarian objects was usually associated with an improved contact with their environment. The expressive objects tended to be archaic in the sense of resembling early primitive art (fig. 3, fig. 4, fig. 5, fig. 6). In this respect our observations confirm those of Schilder (1918), Kretschmer (1952), Naumburg (1950), Malraux (1949) and others.

An impoverished schizophrenic made doorhandles, hammers, a briefcase, a door (fig. 7) – objects which, as a whole, neither lend themselves to ceramic representation nor are they utilitarian.

Compulsive, anxious, or depressed patients who lacked "inner resources" and were poor candidates for any but symptomatic therapy, tended to make utilitarian objects from the beginning, often with meticulous care as to roundness or symmetry. In these cases it was difficult to encourage the patient to "loosen up" and to use the clay in a free, expressive way. Such attempts usually make the patient only more anxious.

The object as a piece of property. The patient who has finished an object in the workshop may manifest various attitudes – either one of ownership, at

Figure 7 Schizophrenic patient. "Door with handle".

times even of anxious possessiveness, or the opposite, namely an eagerness to give. In this respect the activity here does not differ essentially from other forms of therapeutic occupation. Nevertheless, in our experience the three-dimensional object which is formed out of an amorphous matter seemed to have to the patient a greater affective charge as a piece of property or as a gift than other expressive objects such as paintings or other utilitarian objects such as products of weaving or carpentry.

The group and its leader. Patients are usually grouped around one bucket of wet clay from which they all take the necessary material. The "dirtiness" of the work leads to a lot of group discussion and free expression. The disgust with the matter or the liking of it enter into the group spirit, and a lot of teasing, banter, encouragement and complaint referring to the "dirt" goes on throughout the activity. Another specific aspect of the group has already been described -- when we mentioned the fact that here the waiting for the finished product is associated with possible accidents which one can ascribe to other persons. Particularly that period of incubation in the kiln the outcome of which is, in the patient's mind, associated with the nurse, gives rise to those obvious transference mechanisms quoted above.

Discussion and Conclusions

The common denominator of all the cases in which this activity contributed to the therapeutic success specifically, i.e. as distinguished from just any kind of occupation, seemed to be cases in which there existed a central problem of hostility. This is noteworthy not only because it refers to the kind of regressive-primitive component of the work but because it also contradicts the common assumption of occupational therapists, namely that problems of aggressiveness are therapeutically best attacked by activities on hard material and with the pattern of powerful motor activity (Fidler 1954). The most characteristic aspect of

this phase of the work is the fact that the patient received therapeutic benefit on a sub-verbal level, as it were, i.e. without interpretation. Although these patients were on a much higher level of integration than the ones described by Wittkower and Latendresse (1954), the therapeutic mechanism was on principle the same. The mere handling and shaping of the matter and the discussion among the patients about its repulsiveness or pleasantness seemed to have therapeutic effect. The patient with a marked psychoneurotic depression on the basis of repressed hostility said that "ceramics was the greatest revelation of my life" but he could not enlarge on this statement. It is during this first phase that the patient makes the spontaneous choice of an object. This depends on various factors such as on the patient's inner resources and on his mechanisms of defence. Moreover, a transient impoverishment, as it happens after electro-convulsive therapy manifests itself in stereotype, imitative productions. Changes from strictly formalized, compulsive towards freely expressive work indicate dynamic changes during the therapy. Free association about the symbolic-expressive connotations of the objects were not utilized but it is evident that the potentialities would be the same as in the setting described by Azima et al (1956).

As we have seen, the freely expressive activity is followed by a period of waiting, and an element of uncertainty about the final outcome. This phase can be best described as an exercise in reality testing. It is remarkable that just during this particular phase patients with an element of "oral impatience" (alcoholism, drug addiction) showed the most striking reactions. This is at the same time the phase of the process during which the objects can be damaged by fellow-patients or the occupational therapist, or during which the latter can be blamed for a failure. During this part of the procedure again a considerable amount of hostility is verbalized. During this phase it is useful to interpret – either on the level of the concrete, objective situation in the workshop (rivalry, blaming of the nurse for one's failure or just simply for having to wait) or on the deeper level of the infantile "nest situation".

Thus we see that the activity of ceramics has features with very specific therapeutic implications. This is due to the fact that from its regressive-primitive aspect up to its quality as a highly evolved craft it represents a microcosmic scale of the ontogenesis of human activity; that the object choice is one between expressive and utilitarian, and – in the typical forms – between masculine and feminine; and finally, that the structure of the group and the element of "waiting for results" lend themselves to a revival of basic conflicts. It is suggested to establish group-therapeutic settings especially designed to exploit these possibilities further.

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Résumé

Dans toute occupation la nature de la matière première, les procédés manuels de transformation, l'organisation du groupe et de son chef constituent un schéma dynamique précis. En tant que l'une des formes de la thérapie d'occupation la céramique présente un double aspect: d'un part elle se prête bien à des activités avec connotation régressive-primitive (la manipulation et le modelage d'une glaise molle et mouillée), d'autre part elle représente un véritable métier dans le sens d'une création artistique; d'un côté on retire satisfaction devant le résultat immédiat (tout comme dans la plasticine et le fingerpainting la matière prend forme rapidement entre les mains), d'un autre côté le procédé du séchage et de la cuisson introduisent un élément d'attente, de patience. Cet élément d'incertitude du résultat final nous frappe particulièrement lorsqu'il s'agit du développement des couleurs et de la glaçure. Quant au contenu spécifique de l'oeuvre du patient, on y remarque de nouveau ce dualisme qui distingue la céramique des autres formes d'art: le patient doit faire un choix entre un objet représentatif et un objet utilitaire. Il est donc juste de dire que la céramique offre des avantages d'un intérêt très spécialement thérapeutique et dynamique.

L'observation porte sur quatre-vingt huit malades qui, au point de vue diagnostique, représentent un échantillonnage d'un institut psychiatrique. On a insisté surtout sur les points suivants: l'attitude du patient vis-à-vis la terre; si le patient préfère travailler de ses mains ou avec un outil et son attitude générale lorsqu'il manipule les instruments ou le tour du potier; l'attitude du patient durant la période de séchage; l'attitude du patient envers la cuisson, les couleurs, la glaçure et vis-à-vis l'objet terminé en tant que propriété personnelle; le choix des objets; le comportement du patient à l'intéreur du groupe et envers les personnages dirigeants.

Au point de vue dynamique, le dénominateur commun de tous les cas où cette activité a contribué au succès thérapeutique spécifiquement, c'est-à-dire en tant qu'occupation déterminée, semble ceux où existe un problème central d'hostilité. L'activité d'expression libre est suivie d'une période d'attente, en y ajoutant un élément d'incertitude du résultat final. On peut qualifier cette période d'exercice dans l'expérimentation de la réalité. Il est à noter que c'est justement durant cette période que les patients dont la structure comportait un élément d'"impatience orale" (alcoolisme, toxicomanie) manifestèrent les réactions les plus fortes. C'est aussi la période où les objets peuvent être endommagés par d'autres malades ou par la thérapeute d'occupation, et où cette dernière peut être accusée d'un échec. Beaucoup d'hostilité peut ainsi être verbalisée. Il est utile de l'interpréter à ce moment-là – soit sur le plan de la situation concrète et objective dans l'atelier (rivalité, blâme porté sur l'infirmière pour un échec ou simplement parce qu'il faut attendre quelques jours), soit encore sur le plan plus profond de la situation infantile. La céramique comporte des implications thérapeutiques spécifiques. En effet, depuis son aspect régressif-primitif jusqu'au métier grandement évolué, elle représente une échelle microcosmique de l'ontogénèse de l'activité humaine; le choix de l'objet est utilitaire ou expressif et – dans les formes typiques – masculin ou féminin; et enfin, la structure du groupe et l'attente du résultat se prêtent à la reconstitution de conflits de base. On suggère d'établir des thérapies de groupe spécialement désignées à l'exploitation de ces possibilités.

PSYCHOANALYSIS AS SCIENCE — A PSYCHOPHYSIOLOGICAL APPROACH*

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The question has often been asked: is psychoanalysis a science? This question, as will be seen, is made up of two inter-related questions.

In contrast to physics, chemistry, astronomy or geology, the term psychoanalysis defines not only the object of investigation, the psyche, but also the procedure adopted in its study, analysis. Psychoanalysis is a treatment procedure which entails privacy of the analyst and the analysand and an almost daily attendance of the analysand; which prescribes definite time limitations to each session (the fifty-minute hour); which makes use of free associations and dreams; and which prohibits social intercourse between the analyst and the analysand. Psychoanalysis is also a research procedure. The question may be posed: is psychoanalysis a research procedure optimally suited, in the area of investigation, for the gathering of observations which provide the raw material with which science works?

Using the psychoanalytical method, the psychoanalyst is undoubtedly in a position to observe phenomena. These phenomena can be recorded, i.e. they can be presented to other observers. But observations and even recording of observations are not science; they are the first step of a scientific method. Observations become science if hypotheses can be formulated regarding the relationship between the observed phenomena, if these hypotheses can be tested, and if, on verification by repetition, generalizations can be established in the form of laws of behaviour. Predictability and manipulation of the experimental situation are scientific desiderata, but not essential prerequisites of a research design. In astronomy, for instance, the principles of replication and prediction can be applied, but manipulation is an obvious impossibility.

To return to psychoanalysis, nobody can doubt the existence of analytical observations. However, doubts can be cast on the correctness of the inferences drawn from the observed phenomena, i.e. the validity of interpretations in particular and of psychoanalytic theory in general can be doubted. A second question may therefore be raised, the question of whether psychoanalytic concepts are scientifically valid.

To approach these problems is a tempting, though momentous, task. Those interested in this subject may be referred to Pumpian-Mindlin's book, "Psychoanalysis as a Science" (1), to Sybille Escalona's article, "Problems in Psychoanalytical Research" (2), and to Sears' chapter on "Experimental Analysis of Psychoanalytic Phenomena" in J. McV. Hunt's book: "Personality and the Behaviour Disorders" (3). In my own presentation I intend to confine myself to an area only touched upon by the writers mentioned; the area of physiological changes in relation to psychoanalytic theory. Even in this area, for considerations of space, only a few illustrative examples can be given.

My material will be presented under the headings of A. Correlative Studies and B. Predictive Studies.

A. Correlative Studies

A procedure which has been repeatedly adopted has been to study changes in physiological functions during psychoanalytic treatment in individuals with

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or without psychosomatic disease, and to correlate the changes observed with the psychological material produced.

Alexander (4), for instance, reported the case of a hypertensive patient whose rebellious aggressive tendencies and the concomitant anxiety stood in direct relationship to the fluctuation of the patient's blood pressure. Whenever, in the course of the analysis, his aggressive fantasies were roused and reached a preconscious level, his blood pressure rose, whereas in those periods in which he was relatively calm the blood pressure fell.

Another example of studies of this kind is that of a female patient with a gastrostomy investigated by Margolin and his co-workers (5). Independent of the psychoanalytic observations this patient was subjected to physiological observations concerning gastric motility, the colour of the gastric mucosa, volume of gastric secretion, quantitative determination of hydrochloric acid concentrations and quantitative analysis of the pepsin concentration.

During the first phase of the investigation the five gastric functions varied in a synchronous way. During this phase psychoanalytic investigation brought to light: (1) that the sensation of cleaning, handling and rubbing the gastrostomy were pleasurable to the patient; (2) that the patient had unconsciously reacted to her gastrostomy as though it were a sexual organ; and (3) that she had the fantasy that sexual penetration was so violent and destructive that it could lead to death. This last factor was entirely repressed.

After the repression had been lifted, the patient became relaxed and apparently comfortable. During this period she had many homosexual day-dreams. Coincident with this new development gastric functions tended to vary independently of each other.

Subsequently it became apparent that her homosexual fantasies were an attempt at flight from the unacceptable heterosexual implications of the physiologist's activities.

The significance of these correlative studies and of many others is that they demonstrate (1) that changes in physiological function are correlated not only with conscious but also with unconscious emotional states, (2) that these emotional states are related to the emergence of infantile trends, and (3) viewed from an entirely different perspective, that every physiological observation situation involving manipulation and instrumentation by an observer is a stressful situation of varying intensity.

B. Predictive Studies

1. *Ovarian Function*

Therese Benedek's and Rubenstein's investigation (6) started off as a correlative study. They set out to determine whether a correlation exists between ovarian activity and psychological processes. Daily studies of vaginal smears and basal body temperatures and psychoanalytic observations of the emotional life were made independently. The psychoanalytic records were studied by Dr. Benedek at Chicago, and the smears and temperatures by Dr. Rubenstein at Cleveland, Ohio.

On comparison of the two sets of data the following observations were made: (1) During the follicle ripening phase, concomitant with estrone production, psychological material is dominated by heterosexual interest. (2) When ovulation occurs psychic tension subsides. (3) Correlated to increasing progesterone production during the post-ovulation period, passive-receptive and narcissistic attitudes prevail. (4) With regression of the corpus luteum progesterone production diminishes and small quantities of estrone are produced.

This is immediately reflected in the reappearance of heterosexual interest in the premenstrual phase. (5) Upon extinction of progesterone production, eliminative tendencies appear in the psychological material.

On the basis of the observations made, Therese Benedek was able to make the following predictions: (1) Libidinous desire or defences against it are indicative of estrogen production which is increased with adult object-choice and lowered with infantile object-choice. (2) Libidinous narcissism, i.e. a state of self-centredness and self-contentment is indicative of a high progesterone level, while "negative narcissism", i.e. a self-depreciatory attitude corresponds to a low progesterone level. Progesterone production is also correlated with the wish to receive, to retain and, specifically, the wish to be pregnant or the defence against it. (3) With the decline of progesterone production, eliminative tendencies come to the fore which may be expressed on the genital level or on the pregenital levels.

Using these psychodynamic criteria and others, predictions made regarding the hormonal state were remarkably precise. Of 291 incipient estrogen states 282 were correctly predicted, and of 115 incipient progesterone predictions, 113 were correct.

2. *Thyroid Function*

Our own investigations (7) concerned themselves with the inter-relationships between emotional states and thyroid function. Our research team consisted of a thyroid clinician (Dr. Martin Hoffman), of a physicist (Dr. Stephens-Newsham) and of two psychiatrists (Dr. Dongier and myself).

Initially we set out to re-examine previous work carried out in this area. Our short-term studies concerned themselves with the effect of acute, experimentally induced anxiety on protein-bound iodine PBI^{131} and our long-term studies with the effect of chronic anxiety on I^{131} uptake and biological decay. Our experimental subjects were euthyroid psychiatric patients suffering from anxiety states.

(a) *Acute emotional stress*

Our experimental procedure in studying the effect of *acute anxiety* was as follows:

Between the 5th and 12th day after the administration of a tracer-dose of 100 microcuries of I^{131}, blood samples were drawn before, immediately after, and then one to three hours after a stress interview. During these stress interviews, deliberate attempts were made to break down psychological defences, previously evaluated, in order to induce overt anxiety. Of the 36 stress interviews, 10 were selected as the most stressful ones. In none of them was a variation of PBI^{131} to exceed the margin of experimental error. This group of 10, taken as a whole, does not show a trend different from another group of 10 interviews rated as "very little or not stressful". This finding is in disagreement with the observation of Wittkower et al (8) in 1932 and of Hetzel et al (9) in 1952, who used different techniques.

(b) *Chronic anxiety*

To study the effect of *chronic anxiety* on thyroid function, I^{131} uptake and biological decay were used as physiological correlates. We worked on the hypothesis that the faster the gland is functioning, the faster the detectable radio-activity is likely to disappear from it, other things such as iodine intake being constant.

A tracer-dose of 25-100 microcuries of I^{131} was administered orally. Twenty-four hours later the uptake of radioactive iodine (R.A.I.) was measured by placing a scintillation counter in front of the thyroid gland. After correction for physical decay of I^{131} the percent 24-hour uptake was calculated. For a period of three weeks to a month – to estimate biological decay – similar counts were made on an average of twice weekly.

In order to establish a baseline for the method, the 24-hour uptake and the curve of biological decay were studied in 25 volunteers, most of them nurses and doctors on the staff of the hospital. These constituted our control group.

Our experimental group was made up of 71 patients with chronic anxiety states. The degree of anxiety was rated on a three point scale with the help of an "anxiety inventory" designed for this purpose.

The personality configuration of each patient was tentatively dynamically formulated after two to five hours' interview, including a study of free associations, fantasies and dream material. In addition, psychological tests were administered by a psychologist. The results were as follows:

1. No significant difference was found in the 24-hour uptake between the patients and the controls.

2. No correlation was found between the 24-hour uptake and the degree of anxiety.

3. No significant difference was found in the biological half-life between the patients and the controls.

4. No correlation was found between the biological half-life and the degree of anxiety whether rated by the intensity of the subject's feeling or by physiological concomitants.

These conclusions are not in accordance with the findings of Reiss, Hemphill et al. (10, 11, 12).

As our data had failed to confirm a relationship between degree of anxiety and thyroid hyperfunction, we attempted to correlate our experimental findings with psychopathological data from psychosomatic studies of patients suffering from Graves' disease (13).

Psychiatric and psychoanalytic studies of thyrotoxic patients have shown that, usually long before the onset of clinical symptoms and often dating back to childhood, patients suffering from Graves' disease display a picture of emotional and psychosexual maladjustment. On the basis of psychoanalysis or psychoanalytically oriented interviews, different investigators (10, 11, 12, 14, 15, 16, 17, 18), including ourselves (7, 13), have identified and defined certain psychopathological features commonly encountered in these patients. The most commonly found ego defences are: (1) Early premature striving for independence, (2) denial of hostility, (3) undoing of hostile impulses by overconcern regarding the needed and ambivalently regarded object, (4) tendency to gain affection by compulsive doing for others, (5) desire and need for children (conflicting with fears of pregnancy and child-bearing), (6) feminine identification in male patients; (7) finally, these individuals are characterized by feebleness of their defences which makes them anxiety prone. Breakdown of their defences frequently results in onset of thyrotoxicosis.

Using the criteria mentioned but relying on an intuitive assessment of the total personality rather than on factorial weighing, our anxiety neurotic patients were divided into those whose conflicts and ego defences corresponded to those

commonly encountered in thyrotoxic patients (group 1) and those of a different structure (group 2). After a decision by three independent observers had been made and duly recorded, the psychopathological findings were correlated with the experimental findings. An arbitrary limit between short and long half-life was set at 45 days.

Because preliminary observations in 27 patients indicated a positive correlation between the psychological and physiological variables, we then decided that our hypothesis should accept a predictive challenge and picked our patients accordingly. Subsequently, in 44 patients a prediction was made of the type of biological decay on the basis of the psychodynamic formulation.

These predictions proved correct in 34 out of the 44 patients. Statistical analysis using the chi square test indicated that these predictions were statistically valid ($p<0.001$); prediction of a short half-life was correct in 9 out of 12 patients and prediction of a long half-life was correct in 25 out of 32 patients.

The data obtained therefore allow the conclusion that it is possible to predict the rate of thyroid secretion with reasonable accuracy from a psychodynamic assessment of neurotic patients.

Discussion

In discussing the observations which have been made the following points may be raised:

(1) It may be argued that the patients who showed a rapid biological decay were possibly suffering from Graves' disease which had not been diagnosed. In response to this argument it may be pointed out that each patient had been examined by a competent physician and that the possibility of Graves' disease had been ruled out.

(2) One is therefore forced to accept the fact that rapid biological decay occurs in individuals who do not show any clinical evidence of hyperthyroidism. This was to be expected. It is generally accepted that there are important individual variations in thyroid function within the range of normality.

(3) Are we then to assume that individuals with short biological half-lives are more predisposed than others to develop Graves' disease even though it is obvious that most of them never will? This question must remain unanswered for the time being. Genetic and/or nutritional factors may be the sine qua non condition for this event; the importance of epidemiological factors has also been demonstrated. Considerations such as these may explain why only a minority of persons with a personality structure similar to that encountered in patients suffering from Graves' disease become thyrotoxic.

(4) If our basic assumption is correct that a rapid biological decay is indicative of an increased functional activity of the thyroid gland akin to that in hyperthyroidism, our observations support the psychopathological conclusions drawn from psychosomatic studies of patients suffering from Graves' disease.

3. *Gastric Function*

Still more recently Mirsky and his co-workers (19) have carried out a predictive study which concerned itself with the etiology of duodenal ulcer.

There are three parameters which may contribute to the precipitation of duodenal ulcers; a physiological, a psychological and a social parameter. To evaluate the precipitating role of these parameters the investigators studied the degree of gastric secretion as gauged by the concentration of pepsinogen in

the serum and the style of interpersonal interaction as inferred from projective and other psychological techniques. The psychological tests used were the Rorschach, the Draw-A-Person, the Saslow and the Blacky tests, and the Cornell Medical Index. The exposure to 16 weeks of Basic Army training comprised the environmental situation which might prove noxious to some, but not to other, subjects.

A total of 2,073 draftees were chosen at random while being processed at induction. The concentration of pepsinogen in the serum was determined in each of them. From the total series 120 hyper- or hyposecretors were selected for special study. These men were then subjected to psychological testing and to a complete gastro-intestinal X-ray examination. Psychological testing and X-ray examination were repeated between the 8th and the 16th week of their basic training.

Without any knowledge of the pepsinogen levels or X-ray findings, the psychological test material was evaluated by one psychologist and two psychiatrists to test the hypothesis that the hypersecretor could be differentiated from the hyposecretor and that men with, or prone to, duodenal ulcer could be identified. These hypotheses were based on clinical observations which suggested that the hypersecretor, like the patient with duodenal ulcer, would exhibit evidences of intense oral dependent wishes, marked "immaturity" tendencies to please and to placate, and difficulties revolving particularly about the management of oral impulses and hostility. Similar clinical observations suggested that the hyposecretor, like the patient with pernicious anemia, would exhibit evidences of pseudomasculine defences and paranoid trends.

An attempt to differentiate the hypersecretors from the hyposecretors on the basis of clinical impressions of the available psychological test material indicated the criteria used for such differentiation were inadequate. In order to develop a more accurate diagnostic tool, a variety of criteria from the test material were analysed statistically. Only those criteria which were significant at less than the 5% level of confidence were used for final classification. By means of a cluster of such criteria it was possible to distinguish the two groups to the extent that 85% of the 120 men could be assigned accurately to their groups at a 0.001 level of confidence.

An attempt was made to predict on the basis of the test results which individual would develop a duodenal ulcer during the 16 weeks of basic training. Ten men were selected as those most likely to develop an ulcer. The prediction was correct in seven out of the ten. Of the three who did not have, or did not develop, an ulcer, two were hypersecretors.

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Summary

The question raised at the beginning of this paper was "Is psychoanalysis a science?" I have avoided a straight answer to this question, but have set out to demonstrate the inter-relationships between psychological and physiological processes in accordance with psychoanalytic theory.

Successive steps in rigorous research design have been defined as problem formation, review of knowledge, preliminary observation, theory construction, verification by empirical tests, control experiments, repetition of observation by independent investigators, and prediction of behaviour on repetition.

Three investigations concerning ovarian, thyroid and gastric function have been reported in some detail. It has been possible to verify some aspects of psychoanalytical theory by rigorously designed experimental procedures. Predictive psychological changes in relation to ovarian function and predictive physiological changes in relation to well-defined personality functions have been demonstrated. Some light has been thrown on the relevance of emotional factors to the etiology of Graves' disease and of duodenal ulcer.

EVALUATION OF NICOZOL IN THE CARE OF THE SENILE PSYCHOTIC*

FRANK G. JOHNSON, M.D.[1]

The desirability of effective therapy in the mental disorders of senility has been emphasized in recent years by the increasing percentage of the population in the old age groups. This increase is secondarily reflected in the growing accommodation problems in the wards for senile patients in mental hospitals.

In an attempt to find some effective therapy for these patients, various drugs have been assessed clinically over the last few years – the principal of these being nicotinic acid, pentylenetetrazol (Metrazol) and glutamic acid or its derivatives. The rationale for the use of these drugs is mainly based on their presumed action of lessening of cerebral anoxia which is thought to play a part in the production of the symptomatology of the psychoses of old age (5).

The use of pentylenetetrazol in this connection was first reported by Chesrow (3) in 1951. Its action was known to be one of nervous tissue stimulation, especially of the respiratory, vasomotor and vagal medullary centres. He reasoned that, in addition to a general analeptic and tonic action, its influence on the respiratory centre would produce better respiratory ventilation and thus decrease cerebral anoxia. Various clinical reports on its use, both intravenously and orally, have appeared since then, but results on its merits have been conflicting (1, 2, 4, 7-11, 14, 15).

Nicotinic acid, on the other hand, was first used in the treatment of pellagrins, and its use was only later extended to the treatment of organic psychoses of varying etiology, including the senile group (16). Since then, further trials have been carried out, again with conflicting results (6, 8). There are two possible bases for its use: 1. As a cerebral vasodilator – This was first suggested by Moore (12), but his view was subsequently opposed by Scheinberg (13) who denied such an action. 2. As a vitamin – in the knowledge that senile patients often show niacin deficiency and that its use may therefore be expected to produce some benefit.

Studies on a combination of pentylenetetrazol and nicotinic acid have been made in two investigations (8, 17) and both found the combination to produce favourable results. This invited further evaluation of the mixture (Nicozol) which was supplied in the form of pentylenetetrazol 200 mgm. and nicotinic acid 100 mgm. per dram in a lactated pepsin base containing 5% alcohol.

It was apparent that the widely varying results of previous clinical studies on these substances might, in some instances, be due to deficiencies in experimental design – particularly with regard to the need for adequate controls, absence of observer bias and absence of superimposed emotional influences on the patient. In this last connection, it is interesting to note the recent studies of Barrabee et al (2) which show that ward improvement and increasing interest in a hitherto relatively neglected class of patient can result in statistically significant improvement in mental status without addition of any drug therapy.

Method

In this series, twenty female patients were selected in two main groupings on the basis of their symptomatology for study of the mixture. The patients

*Nicozol is the trademark of Winter Laboratories, 341 Bloor Street West, Toronto 5, Ontario for a combination of pentylenetetrazol and nicotinic acid. The drugs and pepsin-alcohol base were generally supplied by this company for the present study.

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selected were representative of the total female senile population (approximately 250) in respect of age and symptomatology. Ten of the patients (group A) were seriously deteriorated – for the most part bedridden and incontinent, and presented a great nursing problem. Although previous reports have shown Nicozol to be of greatest benefit to the mildly deteriorated senile patient, it was felt that its effect on severly deteriorated patients should be further ascertained since any amelioration in their condition would be of greatest assistance in lessening the need for constant nursing care. The other ten patients (group B) were, in general, less severely disturbed, but were unable to rejoin their families on account of confusion, memory loss and disorientation or behaviour difficulties. Diagnostic classification in these twenty patients is set out in Table I. Table II shows the age range of the patients and duration of psychosis.

Table I

Senile Psychosis	9
Psychosis with Cerebral Arteriosclerosis	9
Paranoid Schizophrenia (with predominantly senile symptomatology)	2

Table II

	Group A	Group B
Age (in yrs.)	59-90 mean 75.4	66-86 mean 76.7
Length of Psychotic Senile Symptomatology (in yrs.)	2-8 mean 5.1	½-5 mean 2.1

A double blind technique was used. The effect of Elixir Nicozol was compared in turn with the basic pepsin-alcohol elixir and a syrup solution on the same patients. All three solutions were identical in taste and appearance and neither the physician nor nursing supervisors knew what medication a given patient was receiving. The experiment was conducted over a period of four months and each patient during this period received, in varying order, one month's therapy of nicozol elixir, two months of syrup solution, and one month of basic pepsin-alcohol solution, all at a dose of 1 dram three times daily. Patients taking part in this experiment were not moved to special accommodation and received no added attention from the nursing staff or aides. Examinations, both laboratory and medical, were fitted in with normal routine so that the group under study would not feel more favoured than the remainder.

The physician and nursing supervisors in charge of the wards observed these patients daily and evaluated their behaviour. Results from these examinations were recorded on Malamud-Sands rating scales twice a week by the supervisors and weekly by the physician. Urine and haemoglobin estimations and physical examinations were carried out at the beginning and end of each course of treatment.

Results

1. *Mental Evaluation* – On Elixir Nicozol, patients showed either no change in condition or more frequently became agitated and apprehensive. They often complained of skin flushing which upset them in spite of reassurance. One patient went into heart failure and another broke out in a papulo-macular rash on chest and back which dispersed within a few days of discontinuing medication.

On the basic pepsin elixir, most patients showed no change, but five patients were noted to become slightly more alert and co-operative.

On the syrup control, most patients showed no change, but a few showed either slightly increased activity, or a deterioration in condition.

2. *Physical Evaluation* – Two hip fractures occurred and both of these resulted in the later death of the patient from hypostatic pneumonia. A third patient died after slow deterioration in physical condition, but no significant autopsy changes were evident. This patient had only received syrup and pepsin controls. As mentioned above, one patient on Nicozol became extremely restless and confused and went into cardiac failure. Apart from these cases, no significant variations in physical condition were noted on examination or in haemoglobin and urine investigations.

It was thus apparent from this series of twenty cases that Elixir Nicozol produced no improvement in patients. It did not improve behaviour, reduce confusion, or lessen need for nursing care. In several cases, it actually appeared to produce apprehension and anxiety in patients, particularly when flushing occurred.

The well controlled study of Levy (8), however, on a similar class of patient (thirty in number), using the same drugs, showed contrary favourable results. The marked difference in results between the series here reported and that of Levy cannot be reconciled, but it is considered that, although the patient sample in this pilot study was smaller, the completely negative results must be accorded due significance.

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Résumé

Il y a un besoin urgent de trouver pour les séniles psychotiques une thérapie pharmacologique effective si l'on considère le nombre sans cesse croissant des vieillards dans notre société et en second lieu dans la population des Hôpitaux Mentaux.

La base rationnelle d'utilisation de plusieurs médicaments dans la sénilité repose sur leur supposée diminution de l'anoxie cérébrale, qui jouerait, semble-t-il, un rôle important dans la formation des symptômes chez le sénile.

On passe ensuite en revue un aperçu historique des études cliniques et le présumé mode d'action de 2 médicaments à savoir le pentylenetetrazol et l'acide nicotinique. Des études cliniques de leur effet séparé donnent des rapports

contradictoires, mais deux études ont été faites sur leur administration simultanée et les rapports sont bons.

Dans ce communiqué, on présente une autre série de 20 séniles recevant cette double médication. On les a classées en 2 groupes égaux: le premier composé de patientes sévèrement détériorées et l'autre des patientes légèrement confuses. On a utilisé ces patients comme leur propre contrôle en leur donnant dans un ordre diversifié durant un mois, 200 mgs de pentylenetetrazol et 100 mgs d'acide nicotinique, 3 fois par jour dans un elixir aclool-pepsine, 1 autre mois l'elixir alcool-pepsine seul, enfin entre ces deux périodes, une solution sucrée uniquement.

Toutes les médications étaient identiques et l'ordre de leur administration non connu du médecin ou de la garde-malade.

L'état mental et physique du patient a été contrôlé avant et après chaque phase du traitement par l'examen physique, le dosage des urines et de l'hémoglobine, estimation du comportement suivant les échelles Malamud-Sands.

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